THE EFFECTS OF GOVERNANCE CORRUPTION ON

EDUCATION BUDGETS AND INCOME IN

CENTRAL AND EASTERN EUROPE

by

Tamara Lynn Hannaway

BA, Fort Lewis College, 1984

MBA, Westminster College, 1995

A thesis submitted to the

Faculty of the Graduate School of the

University of Colorado Denver in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

Public Affairs

2012

This thesis for the Doctor of Philosophy degree by

Tamara Lynn Hannaway

has been approved for the

Graduate School of Public Affairs

by

Peter deLeon, Chair

Paul Teske

Robert Reichardt

Christoph Stefes

Date _____

Hannaway, Tamara Lynn (Ph.D., Public Affairs)

The Effects of Governance Corruptions on Education Budgets and Income in

Central and Eastern Europe

Thesis directed by Professor Peter deLeon

ABSTRACT

This thesis addresses economic development in the context of endogenous corruption. We also ask whether economic growth exacerbates poverty or income inequality. The evidence to date is mixed. The thesis examines relationships among and between defined constraints on economic development by offering policy makers a unique method of measuring governance corruption's effects on education budgets and individual income. Governance corruption includes malfeasance, misfeasance, nonfeasance, or perpetrations involving state, non-state, and private sector actors that circumvent, distort, or manipulate the democratic process, and thereby undermine the government's revenue stream. Governance is the official governmental system and institutional 'rules of the game' by which a country is governed; state capture, rent seeking, and free riding behaviors corrupt the system. The Shadow Economy, acting as the surrogate for corruption, measures the percent of total productivity unaccounted for in the official GDP. The individual actor is the unit of measure; Central and Eastern European countries are the sample set; individual income is the dependant variable; and the independent variables are the Human Development Index, education expenditures, and the Shadow Economy. The analyses presented suggest clear evidence that as the size of the Shadow Economy increases, the budget for education expenditures as a percentage of the total national government expenses decreases. The evidence implies that as the education budget decreases, so does the official individual income, and therefore, available measures for economic growth are inadequate to measure income inequality, thereby leaving analyses and conclusions regarding the effects of economic growth on the individual actor, wanting. These findings are consistent with New Growth Theory, particularly, that education is critical to a healthy and sustainable economic development, and offer evidence that adding the effects of corruption to current economic growth models provides unique learning about growth's effects on income inequality. The practical application is that education expenditures and individual income are analyzed together and in light of the effect of corruption on them. This evidence may be appreciable to economic development and education policy making.

Key words: Governance, Corruption, Education Expenditures, Income Inequality, New Growth Theory, Shadow Economy, Human Development, Economic Growth, Economic Development, Sustainable Development.

The form and content of this abstract are approved. I recommend its publication.

Approved: Peter deLeon

DEDICATION

      I dedicate this work to my daughter Hannah, with a very special thank you for your love, smile, vibrance, and the joy you bring. For your love, patience, inspiration, and support, thank you, especially to my mom, dad, grandma, sister, and brother, and also to my extended family, friends, colleagues, mentors, and students.

      Many persons from childhood to today deserve mention and a debt of gratitude. They have imparted wisdom, contributed some important element, provided inspiration, influence, and encouragement. The list is many years in the making, and longer than this dissertation; thank you.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFACE

This thesis analyzes public policy through an economic development policy lens and framework. The purpose of this thesis is to inform economic development policy through the examination of relationships among and between defined influences and constraints on economic development, and to offer policy makers a unique method of measuring governance corruption's effects on education budgets and individual income. The approach used is to compare and contrast 1990 and 2008 economic development as measured by Gross Domestic Product per Capita, or Individual Income; the Human Development Index and its component indices; governance corruption as measured by the "Shadow Economy" (Schneider et al., 2010, p. 5); and Education Expenditures as measured by United Nations Educational, Scientific and Cultural Organization (UNESCO).

The research herein covers broad areas of literature from the social sciences; political science, history, corruption, governance, and economics; and from business, accounting, and education. The unit of measure is the individual. Actors in this thesis may be employees of the state, of non-state institutions, or work in the private sector. Official income per capita is stated in US dollars using the year 2000 as a base year. Narrowing the scope of this array of literature was based on an experience.

While standing in the rubble of what recently was the Berlin Wall in 1989, I looked east, then west, the east again. Grey, Color, Grey. Stooped, vibrant, stooped. Battered, flourishing, battered. A woman, standing behind a smallish grungy table, was selling bits of the wall, stamped with what she stated was some official seal. I bought one, just in case there was such a seal, and picked up another from the piles upon which the tourists walked and children played. The image of dichotomy, contrast, and dissimilarity, in my visual perspective overwhelmed my senses. I knew a few facts about the Cold War, but the textbooks said nothing of what my eyes could see. I felt a communal sense of anguish flowing from the east, while the west was

as familiar as my own United States. Some entity or organism, some insidious, living thing lying to the east, beyond the government or its structures and peace accords, beyond the empty promises believed by the proletariat, was causing the pervasive agony.

Repeated questions tumbled about in my head for a score of years, through several visits to the same and other places behind what was the Iron Curtain. 1) What festering plaque prohibiting citizens from living a life fulfilled? 2) Why could the people not shake it off, loose it, overcome it, beat it? 3) Who were the guardians of the people; where were these sentries; and why did they not act on behalf of the millions of downtrodden? 4) How did the physical infrastructure decay and the economic powerhouse implode? Thus, the variables for this thesis became: 1) Corruption. 2) Education. 3) Governance. 4) Economic policy.

CHAPTER I

INTRODUCTION

This thesis endeavors to inform economic development policy so as to encourage healthy economic growth (Kuznets, 1966, p. 493) without the friction of institutional or political corruption. We also ask whether economic growth exacerbates poverty. The evidence to date is mixed. Deceiving in its simplicity, this fundamental question is of paramount importance as factors of globalization induce growth in the world's Gross Domestic Product (Levitt, 1983). To inform development policy toward a more balanced growth, this thesis examines relationships among and between defined influences and constraints on economic development, and specifically, it offers policy makers a unique method of measuring governance corruption's effects on education budgets and individual income. "Growth," neither culprit nor remedy, is the benign measure of influences on economic productivity over time (Kuznets, 1973). The terms for economic change, *growth* and *development* in this thesis, follow the definitions advanced by Schumpeter (1939) and Kuznets (1934, 1940). Economic growth is incremental change, generally measured by change in Gross Domestic Product (GDP). Economic development is a new steady state. This new level of development is realized in response to economic growth and the evolution, health, maturation, and increased capacity of the economy to sustain growth.

This thesis advances and challenges New Growth Theory (Romer, 1990) by investigating how specific measures of governance, and the corruption within governance, affect growth of individual income; further, it explores linkages between these factors and the causal relationships among them (Barro, 2001b; Sen, 1997, 1999). Data from nations under the former Soviet spheres of influence during the Cold War have extraordinary potential to shed light on governance and development policy. While international attention focused on the transitions from Soviet rule to independence, intergovernmental organizations and academics seized the opportunity for re-

search, documentation, and data collection. Meanwhile, advances in technology and computing power grew exponentially. The breadth and depth of data available for analysis on the consequences of growth are unprecedented.

Research Questions

Research Question 1*:* Are the Human Development Index and Income per Capita highly correlated in the sample set?

Research Question 2: Does governance corruption, as measured by the Shadow Economy, negatively affect Income per Capita?

Research Question 3: Does governance corruption, as measured by the Shadow Economy, negatively affect Education Expenditure?

Research Question 4: Do the pre-test Human Development Index, governance corruption as measured by the Shadow Economy and Education Expenditure together explain the change in Income per Capita?

The key hypothesis this thesis tests is: governance corruption's effects on education through the public resource mechanism, its budget, are direct and negative; succinctly, the higher the degree of corruption, the lower the relative education budget. Further, the lower the education budget per capita, the lower the relative individual income.

The evidence varies on whether economic growth exacerbates or alleviates the relative or absolute income at the national level. Evidence at the level of the individual actor is far more obscure (Galbraith & Kum, 2005). For this reason, the focus of this thesis is the total income to the individual actor.

A comparison of the multinational evidence indicates the presence of four conceptual challenges: First, how do we define and measure individual income? Second, when or what period should we measure? Third, what in addition to income provides a more thorough picture of the living standard of the individual? Lastly, which aspects of governance corruption effect indi-

vidual income? These are important questions for policy makers, as national (aggregated) figures mask the effect of policy decisions at the individual level. For example, measured from 1990 to 2007, Uzbekistan's GDP *increased* 1.2 billion (US equivalent dollars) or 1.8 percent, while the individual income *decreased* from $3,155 to $2,425, or 30 percent, over the same period.

The first conceptual challenge stems from inconsistent definitions and measurement methods, which seem to report contradictory evidence. For example, Lozada describes one side of the debate: "The fierce debates (among)...[a]cademics, journalists, and multilateral organizations...over economic globalization have focused recently on global poverty and income inequality...and a general consensus seems to have formed around the proposition that poverty and inequality are on the rise" (2002, p. 5). Maddison's data show that since 1820, the average yearly world GDP growth is 2.21 percent, while GDP per capita growth is 1.2 percent (2009, p. 4), suggesting that the consensus should be that aggregate and individual incomes levels have diverged. On the contrary, Sala-i-Martin's data, measured in both absolute and relative terms, show that, while the world population has steadily increased, fewer people live in poverty today than at any time in recorded history, and empirical evidence shows converging income levels and an emerging "world middle class" (2002, p. 2). Making sense out of what seem to be contradictory findings would require an exhaustive analysis of the underlying data sets, a justification for and a comparison of the definitions and measurements of the variables, (Pritchett, 1997, pp. 12-13), efforts beyond the scope of this thesis.

Instead, this thesis employs demographic and economic data produced and shared through data networks, and the International Comparisons Program (ICP). Scholars, academics, and professional researchers affiliated with lists of international agencies (*e.g.,* United Nations, World Bank, International Monetary Fund), intergovernmental organizations (IGO), and non-governmental organizations (NGO), including abbreviations as used in this thesis, share data (See detailed list of affiliated organizations in the Glossary). This network of agencies provide data

for public use, which usually include detailed methodology, reliability, and validity statistics (HDR, 2007). Institutes such as Brooking Institution (BI), Transparency International (TI), The Heritage Foundation (HF), International Comparisons Program (ICP), European Statistics, Data, and Metadata Exchange (SDMD) (here after, Institutes), feed critical research and data to the network. The first conceptual challenge is thus met by using data from the same network of sources.

The second conceptual challenge stems from inconsistent measurement methods that led to comparing dissimilar periods. Barro (1991) and Solow (1956), among others, claim that incomes converge over time. Generally, scholars who report that incomes converge favor analyzing the longest time span with the most or best available cross-country data (Barro & Sala-i-Martin, 1991). Conversely, other scholars, who favor analyzing specific periods, argue that the development situation or *stage* of each country's economic growth matters when measuring inequality (Rostow, 1991). The latter group offer evidence that incomes diverge when tied to certain circumstances in history. This point, data knitted with situations, is central to the purpose of this thesis and solving its questions (Matheson, 2008; Pritchett, 1997; Rostow, 1991). Measuring an economy from one arbitrary date to another based on data availability may invite risk. The risk is missing vital information about the characteristics of economic growth specific to each country, its quality and sustainability, and the path, patterns, or cycles of the growth, some of which is available through historical accounts.

One of the first scholars to trace the paths of income over time was Simon Kuznets. Kuznets (1966) invested much of his extraordinary career examining questions about income distribution, economic measurement methods, and growth. He advanced theories that numerous scholars, including several fellow Nobel Laureates (*e.g.,* Robert Solow, Douglass North, Amartya Sen, Gordon Tullock, Edmund Phelps, Paul Krugman, Herbert Simon, Milton Friedman, and others, plus several whose work is not central to this thesis), have studied, tested,

refuted, or confirmed on how and why economies grow. Kuznets argued that the trajectory of income growth depended on the stage of development in a country. He found that the paths of higher and lower incomes in lesser-developed, more agrarian societies tend to *diverge* during periods of economic growth, thus increasing income inequality, while incomes in more developed societies tend to *converge* as wealth distributes over a greater percentage of the population. The second conceptual challenge is met by anchoring the data to a regime change (Rostow, 1991). Following work by Matheson (2008), Pritchett (1997), and Xu & Li (2008), accounting for the *stage* of development (adding the stage as a variable to a development function), creates a framework that invites conditioning variables (*e.g.,* regime, governance, institution), and makes sense out of the standard economic variables (*e.g.,* GDP, life expectancy, educational attainment, trade alliances) by anchoring them to a common phase or event (*e.g.,* industrial revolution, inventions, growth stages, policy stages, regime changes, intrastate armed conflict, treaties, the end of the Soviet Empire) (Brewer & deLeon, 1983; Rostow, 1991; Xu & Li, 2008).

The third conceptual challenge rests in the defining of living standards by a simple dollar figure. While the convergence/divergence debate just described persists, Sen (1984) questions its relevance. He asserts that examining the income level between the richest and poorest in a society may be in vain, as income *per se* may not reflect the reality of human development, yet GDP per Capita (Income per Capita or Ic) is often used to infer or approximate *living standards* in the literature (Deininger & Squire, 1996; Gini, 1921; Kuznets, 1934; Sen, 1984). The third conceptual challenge in this thesis is that empirical evidence on income changes over time neglects evidence of diverging living standards – which has been the origin of media coverage, the Millennial Development Goals, and even armed conflicts. In the Forward to the *2008 Millennial Development Goals Report*, Sha Zukang wrote, today "...2.5 billion people, almost half the developing world's population, live without improved sanitation; [m]ore than one third of the growing urban population in developing countries live in slum conditions" (2008d, p. 4). The third con-

ceptual challenge is met by employing the Human Development Index (HDI) as a measure for the living standard. The work of the Human Development Program, in its 20th year at the United Nations, has provided a center for researching and measuring the living standard (HDR, 2009e).

The last conceptual challenge is in defining governance corruption, and for the purposes of this thesis, *limiting its scope* to that which effects economic growth policy, and limiting its pervasiveness to that which policy may be able or interested to ameliorate. The objective is to isolate "corruption [that] alters the composition of government expenditure" (Mauro et al., 2002, p. 277). Bracketing the span of the state (official), non-state (institutions), and private sectors to isolate expenditure-altering types of corruption are the bodies of literature on (1) political corruption and the (2) unofficial economy. Political corruption is, "a co-operative form of unsanctioned, usually condemned, policy influence for some type of significant personal gain, in which the currency could be economic, political, or ideological remuneration" (deLeon, 1993, p. 25). Unofficial influences include "…those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation or observation," which are measured by the Shadow Economy (Schneider et al., 2010, p. 1). This thesis employs the following working definition.

Governance corruption is a co-operative form of unsanctioned, usually condemned, policy influence that circumvents or otherwise avoids government regulation, taxation, or observation, and alters the composition of government expenditure for some type of significant personal gain, in which the currency could be economic, political, or ideological remuneration.

Can multiple scholars with conflicting theories and evidence on economic development and income levels be right simultaneously? Perhaps. A summary of the conceptual challenges facing researchers and solutions for this thesis follow.

The first challenge is simultaneous convergence and/or divergence in income and/or living standards, which suggest dichotomous definitions and/or uses for these terms and permits

dissimilar data and/or measurement. No wonder scholars disagree. Remedy: Utilize International Comparisons Program data.

The second challenge is simultaneous converging and diverging results, using the same data and methods, which suggests a problem of arbitrary data periods or date ranges unidentified with and/or tied to events, endogenous or exogenous. Solution: Tie data to the fall of the Berlin Wall, the end of the Cold War, and analyze the 30 countries of the former Eastern Bloc (See Country Briefs).

The third challenge: Income is an insufficient measure of the human condition. Remedy: The Human Development Index as a proxy for the living standard.

The fourth challenge is to narrow the scope of corruption to that which (1) is found in the governance process and (2) is measurable and missing from the official GDP. Solution: Employ the working definition of Governance Corruption, measured by the Shadow Economy as a proxy for the missing GDP. Adding background information, or context, makes these challenges easier to understand.

The historical backdrop for this thesis's economic development process follows. Historically, like today, international trade and the migration of people and resources have driven national economies; shifting prosperity and poverty, technology adoption, and the intermixing of cultures (Diamond, 1997; Elisseeff, 1998). Aided by advances in technology and modes of communication, escalating globalization has fueled a blur of activity resulting in increased interdependence of nations (T. L. Friedman, 2005). Why have some nations struggled while others flourish? Levitt (1983) argued that "A powerful force drives the world toward a converging commonality and that force is technology... Two vectors shape the world – technology and globalization. The first helps determine human preferences; the second, economic realities" (p. 1). Nye (2006) adds that, "Globalization has two driving forces: technology and policy. Thus far, policy has reinforced the… effects of technology" (p. 1). Specifically, technology renders dis-

tance (from one village or hemisphere to another) progressively less important. Accordingly, economic development or decay necessarily takes place in the larger context of globalization, induced by technology, through development policy, with public administrators at the reins. The policy makers steer economic development not unlike stagecoach drivers steer a team of horses. Public administrators and policy makers are at the reins of development. Their actions and decisions pilot, guide, and encourage or restrict the Economic Horsepower (EH) of an economy.

Rostow (1991) used *internationalization* rather than globalization to discuss the process by which economies became interdependent. He brought elements of social overhead capital (infrastructure) together with economics in the *Stages of Economic Growth*, which provided criteria (*e.g.,* policy, technology adoption, income inequality, external forces) to weigh the readiness and *capacity* for aggregate economic growth (1991). Sen (1988, 1997, 1999) added that the state's level of development and thus its capacity to tend to the human development (individual) needs of its citizens is a key factor in the inequality formula, where capacity is the measure of total potentiality, whether actual or merely possible. North (1994, p. 17) underscores the necessity for well-informed policy decisions to manage the "unanticipated consequences and outcomes of decisions made in the face of uncertainty" a condition that is further constrained by the "limited capacity of humans to solve the complex problems" (North, 1994, p. 19; H. Simon, 1972). The research questions are studied in light of globalization, as the force of globalization adds an undercurrent of involuntary activity from seemingly exogenous sources and a theme of necessity to the balance of the literature. Understanding the elements of this debate is critical to informing development policies that mitigate growth's potentially negative consequences (Sen, 1999).

Problem and Research Approach

The IMF reports that "[c]orruption … diverts public resources to private gains, and away from needed public spending on education and health….[and], by reducing tax revenue …it can accentuate income inequality" (IMF, 2011d, p. 1). However, gaps exist in the literature on certain measures of corruption's effects on public education budgets, and on certain measures of the diminished budgets on individual incomes. Further, it seems plausible that diminished education funding affects certain measures of individual income. Kuznets referred to the ability for an individual to earn income in part, his education and skill training as "the reverse side of income" (1934, p. 7). Yet, supporting evidence of corruptions effects on education budgets and income has lacked careful attention.

Hence, the overarching hypothesis this thesis tests is that the effects of governance corruption on education through the public resource *mechanism*, its budget, are direct and negative; we posit that the higher the degree of corruption, the lower the relative education budget. Further, the lower the education budget per capita, the lower the relative individual income. The combined weight of just these two effects of corruption on long-run economic growth is potentially debilitating.

The measure or degree of governance corruption in a country and its effect on the functioning of that country is corrupt by its very nature. In order to measure corruption's effect on a government function such as its development policy, its economy, or human development, a country must first account for it on its balance sheet. It must measure the extent of the problem of corruption in dollars.

Rent seeking, according to Tullock (1993, p. 2), is "the outlay of resources by individuals and organizations in the pursuit of rents created by government." By reducing the public resource pool, the remuneration for corruption could shift toward that which complements the endeavors

of those that are corrupt and away from approved, sustainable economic development and market-demanded goods and services (S. Gupta et al., 1998).

"*State capture* is any group or social strata, external to the state, that exercises decisive influence over state institutions and policies for its own interests against the public good" (Pesic, 2007, p. 1). Essential to this thesis, IMF scholars Mauro, Abed et al. (2002, p. 278) assert that extorting from education starts before the budget approval, so fewer dollars are allocated to education, and more are allocated to projects where that extortion is easier to hide.

An initial inquiry into relationships among and between governance, corruption, economic development, and individual income variables yielded the four conceptual challenges addressed above. The three problem themes follow.

Problem One includes gaps in the recent literature specifically tying governance corruption to the *mechanisms* through which the corrupt affect income inequality (deLeon, 1993; S. Gupta et al., 1998; S. Gupta et al., 2000; Rose-Ackerman, 1999b). The second problem includes difficulty measuring governance, corruption, and economic development at the aggregate and individual levels (Galbraith & Kum, 2005; Schneider et al., 2010a). Solving the mechanism and measurement problems requires that we add to the working definitions of governance corruption, an explanation of the GDP and Income variables.

Accounting for governance corruption requires adding Official and Unofficial compensation. Compensation *On the Books* adds to a country's official GDP through National Income Accounting (Kuznets, 1934). Remuneration *On the Ground* avoids official ledgers, and creates or adds to the unofficial economy, or *Shadow Economy* (SE). The Shadow Economy is defined as remuneration generated through actions and transactions representing primarily tax, regulation, and administrative process avoidance (Schneider et al., 2010, p. 5). The Shadow Economy is a "situation where businesses operating outside the tax system and registered businesses conceal transactions to avoid paying taxes or social security charges, or to avoid the costs associated with

legislation on safe working conditions or protection of consumers' rights" (Russell, 2010, p. 10).
The Shadow Economy includes rent seeking and state capture, which are discussed later.

Governance is restricted to the purview of formal, official governmental institutions at
the national level plus the informal or unofficial institutions (North, 1991a) or "the traditions and
institutions by which authority in a country is exercised" (Kaufmann, 2006, p. 82). The informal
institutions may include officially recognized entities such as labor unions, and unofficial entities
such as cartels. The scope of the informal institutions include the IGO, NGO, and business com-
munities as they engage in transactions and the democratic process (Mauro et al., 2002). Other
types of governance or management (*e.g.,* corporate governance, business, institutional, or organ-
izational management), while essential, are outside the scope of this thesis except to classify the
productivity of goods or services as official or unofficial. History provides much evidence that
governing regimes produce a spectrum of economic development results, some not so good.
Armstrong (2005) asserts that *good* governance is a by-product of sound public administration
and strong governmental institutions; it minimizes corruption and reinforces healthy and sustain-
able economic development. Good governance, by definition, requires integrity, transparency,
and accountability in the public sector (pp. 1-2). Conversely, *poor* or *weak* governance lacks the-
se characteristics; it mushrooms out of corruption and maladministration, carrying with it
devastating human costs (*e.g.,* poverty, inequality, ill health, illiteracy) and a "lack of public trust
that undermines and even destroys political stability" (p. 9).

Problem Two is the measuring corruption *per se* (Kaufmann, 2006, p. 82). However, re-
cent economic and statistical modeling has provided increasingly reliable approximations of its
influence and economic costs through surveys, extensive audits and tracking of markets that are
clandestine, extrapolation aided by increasing statistical capacity, and redundancy over time (p.
82). The IMF uses the portion of total production attributed to the unofficial economy as a proxy
for the level of governance corruption (Abed & Gupta, 2002b; Russell, 2010; Schneider, 2009;

Schneider et al., 2010). This thesis follows the IMF's lead, using the definition and measurement

devised by Schneider & Enste (2000), for the unofficial or *Shadow Economy*, as the proxy for the

corruption found in governance.

Measuring economic growth's effect on the individual income, economic condition, and

living standard requires a standardized measure. Sen addressed these elements by conceiving the

Human Development Index (HDI) and subsequent Human Development Reports (HDR) from

1990 through present. A *living standard* is characterized, in part, by an individual's insufficient

means to earn a living, particularly by insufficient education or skill and the access to basic needs

(HDR, 2009e). Healthy and sustainable economic growth is a byproduct product of a healthy

economy, which is maturing, growing, tending to the human development and thereby capacity

development needs of its population, and is not likely to exacerbate poverty rates or levels

(Kuznets, 1971; Thomann, 2008).

Measuring economic growth accurately and adequately spotlights limitations Kuznets

knowingly built into the National Income accounting system, still used by researchers and policy

makers throughout the world today to report data used internally by country and externally to in-

ternational agencies.

> Economic welfare cannot be adequately measured unless the personal distribu-
> tion of income is known. And, no income measurement undertakes to estimate
> the reverse side of income, that is, the intensity and unpleasantness of effort go-
> ing into the earning of income. The welfare of a nation can, therefore, scarcely
> be inferred from a measurement of national income as defined (Kuznets, 1934,
> pp. 6-7).

Kuznets' "intensity and unpleasantness" (p. 6) represents a spectrum of *types* of effort.

Effort ranged from the required physical toil to the dexterity to manage the necessary motivations

and the overall economy. Likewise, the effort ranged from the mental muscle required in policy

learning to the earning of a degree.

Kuznets' distribution of personal income is quantitative and the "effort going into the

earning of income" is qualitative (p. 7). GDP data, together with other economic indicators, pro-

vides sufficient material to replicate Kuznets' original tests using new data. Yet, even significant results from testing income distribution in the equation reaches not half of the essence of his assertion. Capturing and measuring the "intensity and unpleasantness of effort going into the earning of income" (pp. 6-7) is at the heart of Sen's work on human capability and is central to his human development research (1997, 1999, 2004). It adds valuable context to Kuznets' "reverse side of income" (1934, pp. 6-7). The HDI measures economic development holistically by measuring the development of its citizens' capability to earn and live. By doing so, the HDI records a measurement by which policy analysts can evaluate development policy (HDR, 2009e; Alkire, 2005; Mazumdar, 2003).

Problem Three is the scope and limitations of this thesis. Important to note here is that many variables that are widely used in cross-country analysis on economic growth and individual income in transition countries are beyond the scope of this thesis. Specifically, future research would include three important variables. (1) A variable critical to economic productivity would measure progress toward market liberalization (Sachs & Werner, 1995). In the 2010 Transition Report, the EBRD offers a "new sector-based approach to measuring transition progress" that provides data on privatization, markets, banking, and infrastructure (p. 3). (2) Progress toward EU accession, measured by the European Commission (2011b). (3) A variable critical to understanding economic growth patterns would mark the history and intensity of armed conflicts (HIIK, 2010a). Variables that indicate market liberalization, EU accession progress, and periods of unrest may add explanatory power to the analysis.

Sequence of Reasoning

Step One in the sequence of reasoning is to create a baseline or starting point that measures the accumulated stock of human development in each country in 1990. The Human Development Index (HDR, 1990) equally weighs three observations: the Life Expectancy Index (LEI), the Educational Attainment Index (EAI), and the GDP Index (GDPI). This baseline meas-

ure becomes the pre-test, independent variable, HDI_{1990}. Data are available for each of the countries in the sample set. We test to ensure that the HDI baseline of the sample data are consistent with widely accepted findings, where the GDP per capita is not a statically significant proxy for the living standard or human development, consistent with Galbraith & Kum (2005), Sen (Sen, 1984), and Kuznets (1934), among others. Research question one correlates to step one in the logic sequence.

Research Question 1: Are the Human Development Index and Income per capita highly correlated? If GDP per Capita is not a sufficient proxy for the stock of human development, we can move forward with the next step.

Step Two measures governance corruption's effects on GDP per Capita, or Individual Income per Capita (Ic). Some scholars argue that *all* of the accepted income measurements lack accuracy due in large part to the inaccuracy of the production data going into them (*e.g.,* Galbraith & Kum (2005); Schneider & Enste, (2000)). Even the best GDP data report only the income earned on production of goods and services that are accounted for *On the Books* in the National Income Accounting system Kuznets designed (1934, ch. 1). The balance of the remuneration moves through the unofficial economies (Abed & Gupta, 2002b; Schneider & Enste, 2000). The notation for aggregate income *On the Books*, or Official Individual Income is Ic_O. Likewise, estimated corruption remuneration earned *On the Ground*, the Unofficial Individual Income per Capita, is Ic_U. Adding the two streams of productivity together approximates the total value of goods and services produced in a country in one year, Total Individual Income, $I_O + I_U = I_T$ (Galbraith & Kum, 2005). (See Data Legend in Appendix). Research question two corresponds to step two in the logic.

Research Question 2: Does governance corruption, as measured by the Shadow Economy, negatively affect Income per Capita?

14

Step Three's purpose in the sequence is to uncover the relationships among and between the elements of corruption defined by the Shadow Economy and education funding. In the official National Income Accounting for GDP is an allocation for public education funding. The official government's budget line item, Education Expenditure as a Percentage of Total Government Expenditures (EE), reflects an education target set forth in that country's economic development policy. In Armenia from 1999 to 2007, for example, the official expenditure on public education averaged 2.52 percent of the GDP. This translates to 13.2 percent of the total government expenditure (UNESCO, 2009d,Table 13). Research question three corresponds to logic step three.

Research Question 3: Does governance corruption, as measured by the Shadow Economy, negatively affect Education Expenditure?

Step Four is the key research question for this thesis. It sets up the reasoning to test the Ic, HDI, SE, and EE variables simultaneously. Nelson and Phelps write, "…educated people make good innovators, so that education speeds the process of technical diffusion (1966, p. 70). According to Romer (1994b), Arrow (1962), Lucas (2009), and others, education's unique contribution to economic growth is increasing returns or knowledge spillovers, which sets education's contribution apart from other public goods (*e.g.,* infrastructure, health, defense, etc…) and from other economic growth factors (*e.g.,* consumption, savings and investment, trade balances, tax consequence, etc…). For a country and its citizens, education is an investment in future economic sustainability. For a Shadow Economy and its constituents, an educated citizenry may be threatening (Monas, 1984). Hence, Education Expenditure budget provides a logical line item, though certainly not the only line item, from which to direct public funds (Freire, 1970). Research question four corresponds to logic step four.

Research Question 4: Do the pre-test Human Development Index, Governance Corruption, and Education Expenditure together explain the change in Income per capita?

Step Five is to define the parameters of the sample data set.

Sample Set Rules

Rule 1: The country was or remains Socialist

Rule 2: Four or more years of Soviet influence (Sachs & Warner, 1992, 1996, 1998), plus a created, liberated, or re-gained sovereignty, independence or the ability to trade, travel, and migrate which began between 1988 and 1992.

Rule 3: Geographically related by inland border, trade or sea-trade route, and western oriented.

Rule 4: Ethnolinguistically interrelated, Economically interdependent

Thesis Overview

The purpose of this thesis is to explore the intricacies of the effects of governance corruption (measured by the Shadow Economy) on individual economic growth (measured by Ic) through education budgets (measured by Education Expenditures on public education as a percentage of GDP). Chapter 2 reviews segments of the major bodies of literature that are specifically relevant to governance, corruption, and human and economic development to frame the thesis, starting with broad academic themes and theories, and narrowing to the specific works upon which this thesis is built. In doing so, the work outside the scope of this thesis is excused and the reasons for this are discussed. This segment adds context to the data. Chapter 3 explains and examines these data, describes logical flow of the equations for analysis, and discusses each step in the econometric methods with which the data are analyzed. Chapter 4 presents the results, describing complications and resolutions to data or methodological issues. Chapter 5 offers an analysis of the econometric results and discusses the findings in terms of the framework, specific theories, and the model employed, as well as necessary caveats and limitations of the data. Chapter 6 describes some potential next steps for the policy community and suggests future research scholars may undertake to further the thesis findings. The Appendix in includes the Country Brief, in which is found data on each of the countries in the sample set relevant to governance, corruption, and human and economic development.

CHAPTER 2

LITERATURE REVIEW

The goal of this dissertation is to inform economic development policy to encourage healthy economic growth (Kuznets, 1966, p. 493; Sen, 1997) using the New Growth Theory that is widely accepted in cross-country longitudinal analysis (Cortright, 2001b; Romer, 1996). Clearly a proponent, Romer (1994a, p. 21) asserts that, "The most important job for economic policy is to create an institutional environment that supports technological change." The following literature review takes advantage of New Growth Theory's treatment of development policy and knowledge capital, which is characterized by increasing returns, and which is required to adopt and exploit technological advance (Phelps & Nelson, 1966; Romer, 1993). New Growth Theory bridges the two main theories on economic growth, which lie on a continuum from endogenous and exogenous drivers. The incentives provided by national governance via the development policy process bridge endogenous growth motives and exogenous knowledge catalysts. The major bodies of literature reviewed are governance and corruption as a dimension of governance, economic growth and economic development, human development and its components, and theories about and measurement of education outcomes.

Governance

According to the IMF (2011d, p. 1), "[g]overnance is a broad concept covering all aspects of the way a country is governed, including its economic policies and regulatory framework." The IMF definition frames the concept by identifying the level, manner, and system of authority. This framing permits a separation in the governance literature between *dimensions* that inform this thesis and those that do not. Pertinent are the forms of governance that directly influence national-level development policy specifically through its budget. Further, the influence on governance through informal authority by any institution or organization is recognized and included. Corruption is, therefore, included, as it must be given that corruption is "informal" and influences governance.

Kooiman & Jentoft (2009, p. 818) assert, "[t]he term governance has become a catchword in the social sciences as well as in the policy world… [and] has different meanings to different people." It is usually qualified by such terms as good, network, global, natural resource, or public, "while general theorizing on the concept remains rare." For example, Boviard & Loffler (2003, p. 316) define "public governance to be the ways in which stakeholders interact with each other in order to influence the outcomes of public policies." Stoker, in *Governance as Theory* (1998, p. 18), proposes aspects of governance. For example, governance "recognizes the power to get things done which does not rest on the power of government." The IGOs leading the storm of research activity on national and institutional governance each define governance slightly differently, according to the respective organization's need. The OECD, focuses (mostly) on governance between the national and sub-national public sector and private firms working within the public sector's domain (*Towards Better Measurement of Government*, 2007). The UN works with institutions at every level through programs worldwide focusing on the human condition and poverty elimination (1985), and peace keeping. The IMF promotes soundness and transparency in banking and financial management (2011d). The World Bank focuses on strengthening the

economic development ability of national-level institutions and governments through governance norms and generating aggregate data for all nations (2009g). The scope, breadth, and depth of literature on governance are thus, enormous; however, the dimensions of governance central to this thesis present a narrow spectrum. The following section defines the boundaries between governance literatures by their specifications to include or excuse them from a role in this thesis.

North's (1991a) work on governance combines the formal government plus the institutions as actors that command respect in the economy. Institutions, considered broadly, are, "the humanly devised constraints that structure human interaction--the 'rules of the game'" (North, 1994, p. 8). Informal institutions permeate the culture in a variety of forms (*e.g.,* a cultural norm, NGOs, the local PTA, unions, family movie night, gangs, mafias, industry associations, charities, churches, holidays, lobbyists, and political action committees), and may have positive, neutral, or negative impacts on government's formal policy objectives. Here, governance is restricted to the purview of (1) formal authority of governmental institutions and (2) informal authority or influence by institutions (North, 1991a) that affect national-level government budget, taxation, spending, fiscal, or monetary policy. The scope includes governance over certain actions and transactions by official, institutional, and private organizations or their respective individual actors.

To limit the *breadth* of governance, forms of governance, or management, which serve to manage or direct the *inter*working of private-sector operations (*e.g.,* business, institution, enterprise, company, charity) or Non-Governmental Organizations (NGOs) and associations, are outside the scope of this thesis (Kettl, 2000).

The depth of governance relates to the level at which governing takes place. Global governance, for example, focuses on "updating the existing multilateral institutions, and creating an effective oversight body …to bring together national government, multinational public agencies, and civil society to…address global challenges" (Boughton & Bradford Jr., 2007). Susan Rose-

Ackerman proposes an international "tribunal" or other form of multinational non-governmental organization (Rose-Ackerman, 1999a, p. 195). The option of governing from the highest level seems unlikely to gain traction as global powers such as the US and EU seek to fortify autonomy through leadership, alliance, and example (Armitage & Nye, 2007; Kaminski, 2005), and have more readily supported the governance strengthening efforts within a national or regional scope. Hence, a global perspective is outside the scope of this thesis.

The other extreme limits the scope of governance research to that of only a national government's formal influence. This is equally unrealistic as a method to solidify good governance as this neglects the influence of the private sector, institutions, and the IGO and NGO communities in particular (North, 1991a). On the contrary, informal authority by any of these entities, listed above or tacit, is within the scope of this thesis, if the influence affects national-level economic development policy (i.e. through variation, adaptation, modification, or transmutation within the development policy process or within the fiscal or monetary policy processes), economic growth, sustainability, or economic outcome.

To limit the *depth* of governance, levels of governance above the national level (*i.e.,* international agencies such as the UN, and intergovernmental organizations such as the European Union) or beneath the national level (*e.g.,* non-national, regional, territorial, municipal, tribal) that serve to manage or direct the *inter*working of non-national-level governments, are outside the defined scope of this thesis.

An understanding of a country's governance must capture the *method* by which the government system governs. Government systems exist on continuum from centralized to decentralized decision-making and control, adding another dimension to the concept of governance. Governance literature exposes "the relationship between state intervention and societal autonomy, (and)…different strands of the literature highlight different facets of this continuum.

Existing understandings may be classified according to whether they emphasize the politics, polity or policy dimensions of governance" (Treib et al., 2007, p. 4).

To summarize, the word *governance* refers to the system, structure, and form of government including its actors, as well as the act of governing or the method by which a system is governed. Governance includes the scope and breadth of influence, official or unofficial, that affect the legitimate public sector, institutional, political, and policy systems (North, 1991a; deLeon, 1993; Mauro, 2004; Kaufmann et al., 2008) and command respect and allegiances in society and, therefore, on the economy itself (Rose-Ackerman, 1978, 1999; North, 1991a). Governance actors include public and private institutions, public officials, and private citizens transacting in the democratic process (Thompson, 2007, p. 2).

Measuring Governance

Governance scholars seek to understand, to measure and, to *measure the impact* of both the formal and the informal authority in a given society if it were to be able to manage its system for the greater good of the whole nation (Abed & Gupta, 2002b; Kaufmann et al., 2000; Treib et al., 2007). However, measuring an intangible (such as transparency in governance) is an elusive matter of perception, and the task, enormous. World Bank's governance scholars created a methodology for the World Governance Indicators (WGI) metric (Rose-Ackerman, 2006). "The indicators are based on several hundred individual variables measuring perceptions of governance, drawn from 35 separate data sources constructed by 32 different organizations from around the world" (Kaufmann et al., 2008, p. 1). The aggregated score, or index, is used as a meter of governance "process…capacity…(and) respect" (p. 7). The six dimensions of governance are Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption (Kaufmann et al., 2008).

Similarly, UN agencies such as the United Nations Development Programme, measure participation, consensus orientation, accountability, transparency, responsiveness, effectiveness

and efficiency, equitability, and rule of law (2009f). The UN adds more survey information gath-

ered from the same and other country-level agencies as the WGI to augment the data for a gov-

governance index suitable to UN needs, which reflect sub-national governance factors (*What is*

Good Governance?, 2009). Therefore, the UN data are not sufficient for this thesis. The IMF

concentrates its research on governance of financial institutions rather than national-level gov-

ernmental governance, and is not appropriate for this thesis (IMF, 2011d).

Critics are quick to list the *limits to* and *faults in* the available governance indices.

"Tackling the issue of measuring governance was the premise of a meeting of scholars, data ex-

perts, clients, donors, and policy makers at the Kennedy School of Government, Harvard

University, in May 2003" (Besancon, 2003, p. 1).

> The World Bank's Worldwide Governance Research Indicators Dataset, the
> Global Governance Initiative, the OECD's Participatory Development and Good
> Government rankings, Freedom House's index, and Transparency International's
> rating system for governance are all primarily subjective, being based on expert
> or informed opinions, systematically gathered and arrayed with or against other
> perceptions and surveyed views. So are the majority of the forty-seven data sets
> [that are available]….Data experts inform us that one of the simple reasons for
> using subjective data is that no complete cross-country, objective data are availa-
> ble, particularly from the underdeveloped nation states.

Answering the critics, efforts to complete objective research are underway. Based on a

successful pilot study, using field researchers collecting data from a sample of countries that pro-

vided information-rich data, Robert Rothberg (2005) asserts that the time has come for a

quantitative measure of governance. Until such a project is complete, he suggests an ordinal

ranking of countries, an index, to bolster the qualitative data, following the lead of the WGI, Hu-

man Development scholars and others. Johnston (2007, pp. 8-9) put forth a benchmarking

strategy that emphasizes integrity in government processes; however, like that of Rothberg, this

effort is also time and resource intensive. Most critics agree that the WGI is the most widely ac-

cepted index, largely due to the funding provided by the World Bank for developing it, and for its

inclusivity of non-Bank scholars, national, and international agencies (Bovaird & Loffler, 2003;

Kurtzman et al., 2004). Radelet (2003, p. 33) writes, "[t]he most comprehensive set of global governance indicators has been compiled by the World Bank and combines subjective and objective attributes." Absent completed objective research, however, and because field research is limits to a handful of countries, these sources are insufficient. Instead, this thesis employs data that estimates the budget effects of governance, discussed further in the section Measuring Corruption (Schneider et al., 2010a).

Moving on, while the international agencies have a unique governance foci (*e.g.,* IMF, Bank, OECD, and UN), each stress the criticality of *good* governance to foster sustainable economic growth and development, and inclusive prosperity. The distinction made between governance and the characteristics of good governance is central to this thesis. As Kaufmann, (2000, p. 1) state, "...there is a strong causal relationship from good governance to better development outcomes such as higher per capita incomes, lower infant mortality, and higher literacy."

In this thesis, a two-equation simultaneous linear regression model, the Multiple Indicator and Multiple Causes (MIMIC) equation to estimate and measure governance as a missing variable. This equation measures the quality of governance by the percentage of corruption and underground activity in the economic process simultaneously (Breusch, 2005, p. 5). Given that GDP is the standard measure for an economy (the argument for this is developed in the literature review section on economic growth), the estimated percentage of simultaneous corruption and underground activity missing from the GDP is the inverse of the quality or 'goodness' of governance (Schneider et al., 2010a).

Good Governance and Sustainable Development

According to Rotberg (2009, p. 113) "[g]overnance is the delivery of political goods to citizens. The better the quality of that delivery and the greater the quantity of the political goods

being delivered, the higher the level of governance….” Over time, civilizations have thrived, prospered, deteriorated, and dissolved for many reasons beyond the scope of this thesis. Despite this waxing and waning of civilizations and nation states, and essential to this thesis, however, is clear evidence of a general accumulation of capability such as economic and human capability, commerce, longevity, learning, and technology, all of which were subject to (or because of) the prevailing system of governance. Grindle (2011) describes a new theme in governance literature.

This common theme suggests a new generation of thinking that emphasizes the importance of knowing the context in which reformed policies, institutions, and processes are to be introduced, and designing interventions that are appropriate to time, place, historical experience and local capacity…. Understanding the historical evolution of how countries muddle their way toward relatively efficient and effective institutions is critical…. (p. 415).

Many scholars have sought to measure the stock of capability, inherited or earned, as an indicator of the quality or the degree of goodness of governance. For example, Elisseeff (1998) studied the Silk Road trade routes, which fostered a mixing of races and cultures, as well as the building of vast realms, such as the Mongol, Roman, and Persian empires. Language, culture, ethnicity, heritage, beliefs, religions, customs and philosophies, migration patterns, trade routes and knowledge diffusion, geography and climate, political arrangements and government structures, and pure blind luck, among other historical human and institutional factors together, affect and are affected by governance (Diamond, 1997; Elisseeff, 1998; Mauro, 1995). These are elements of governance, but neglect a measurement of governance, and offer an insufficient metric for this thesis.

However, to accommodate the diffusion of cultures and institutions, scholars developed a measurement for the degree of ethnic, linguistic and religious homogeneity, heterogeneity, or what they term *fractionalization*, and its effects on economic growth (Alesina et al., 2002). Mauro (1995) used an index of ethnolinguistic fractionalization, as an instrument to account for the

25

homogeneity as an indicator of cultural behavior, language based, and non-language based communication barriers. La Porta & Lopez-De-Silanes (1999, p. 223) used the opposite measure, ethnolinguistic heterogeneity, to inform "theories of determinants of institutional – and more specifically government performance" (p. 233), on the importance of economic, political, and cultural historical factors. They asserted that poor countries, closer to the equator, that "use French or socialist laws, or have high proportions of Catholics or Muslims, exhibit inferior government performance" (p. 222). Good government performance, to these scholars, is, "good economic development" (p. 223). Ethnolinguistics is important in governance research. "Ethnoliguistically homogenous countries have better governments than heterogeneous ones. Common Law countries have better governments than French civil laws or socialist law countries. Predominantly Protestant counties have better governments than [do] either predominantly Catholic or predominantly Muslim countries" (1999, p. 265). Moreover, those with a history of British rule with Protestant traditions seem to be less corrupt (Serra, 2006; Treisman, 2000).

Fractionalization is adopted in this thesis through the proxy variable for corruption, the Shadow Economy, as it is one of the inputs employed by Schneider et al. (2010). Wars and holocausts greatly affect its index value, as holocausts decrease a country's fractionalization by exterminating a segment of ethnic or religious groups (Burleigh, 1996). Following is an example of the effect a fractured population has on growth (Alesina et al., 2002, p. 9).

> In terms of economic magnitudes, the results…suggest that going from complete ethnic homogeneity (an index of 0) to complete heterogeneity (an index of 1) depresses annual growth by 1.9 percentage points. In other words, up to 1.77 percentage points of the deference in annual growth between South Korea and Uganda can be explained by deferent degrees of ethnic fractionalization.

According to Paulo Mauro (1998a, p. 266), "[t]his variable is a good instrument because, in accordance with Shleifer and Vishny (1993) arguments, more fractionalized countries tend to have more dishonest bureaucracies. The index of ethnolinguistic fractionalization has a correlation coefficient of .36 (significant at the conventional levels) with the corruption index." Mauro

(1998a, p. 266) added a proxy for the degree of *state capture* by Ades and Di Tella (1994), a proxy for the degree of *rent-seeking* "following arguments by Sachs and Warner (1995)", and "whether the country achieved independence after 1945 (following Taylor and Hudson, 1972)." The correlation coefficients between these and corruption index were .21, .23, and .41, respectively (Shleifer & Vishny, 1993).

Barro & McCleary (2003), following North (1994), measure belief systems as a determinant of governance. Furthering work by Max Weber (1930, pp. 22-27), La Porta et al. (1999) use religion as "a proxy for work ethic, tolerance, trust, and other characteristics of a society that may be instrumental in shaping its government" (p. 224). The key finding as it pertains to this thesis is this: "Statist laws are thus a more robust predictor of poor government performance than interventionist religions" (p. 264) or cultural influences (p. 224). Therefore, a country's fractionalization, its political, legal, economic, religious, and cultural history, its age as an independent state, and the influence of unofficial institutions through rent-seeking and state capture, are posited to be critical influences in and on governance, yet taken together are insufficient to measure governance directly.

Economic geography, which explains concentrations of economic activity based on geographic space, adds an understanding of the role of global latitude and climate in the economic growth (Diamond, 1997; Krugman, 1998; Nissan, 1991). Scholars continue to work on modes and methods of governance delivery in an age of rapid information dissemination to foster an increased understanding of how the power of institutions determines the quality of governance (Kersley et al., 2008; Kettl, 2000; Lynn, 1998; Treib et al., 2007). Heritage, migration, geographic proximity, and the diffusion of races and knowledge all inform the notion of governance, but do not measure it adequately.

Human Development as a Metric for Governance

Building off Kenneth Arrow's work in Social Choice Theory (Arrow, 1963a, 1963b), Sen's seminal work in welfare economics laid much of the foundation for the body of literature in human development. Sen's *Inequality Reexamined* (1992), *Human Capital and Human Capability* (1997), and *Development as Freedom* (1999), provide the framework for using the Capability Approach as an indicator of prior governance, and to measure governance (Alkire, 2005). "Perhaps most importantly, the human development approach has profoundly affected an entire generation of policy-makers and development specialists around the world" (HDR, 2009e, p. iii). Working with United Nations Human Development Programme (UNDP), Sen and Huq devised the Human Development Index (HDI). The HDI is an indexed value for the accumulated store of a country's human capital and human capability. This stock of capability is the summation of the whole of a country's history; that includes the effects of ethnic, linguistic, and religious fractionalization, the geography, travel routes, trade agreements, regime changes and wars, latitude, climate, plagues, and holocausts, and luck (HDR,1990; Sen, 1997).

> The human development index is a composite index that measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, as measured by life expectancy at birth; knowledge, as measured by the adult literacy rate and the combined gross enrollment ratio… and a decent standard of living, as measured by gross domestic product (GDP) per capita in purchasing power parity (PPP) US dollars [in 2007 as the base year] (HDR, 2007, p. 225).

Scholars collaborate and share research and data through networks such as the International Comparison Program (ICP) and Eurostat's Statistical Data and Metadata Exchange (SDMX), delivering data sets for internal and public use. These "state-of-the-art measures incorporate recent advances in theory and measurement and support the centrality of inequality and poverty in the human development framework.…with the intention of stimulating reasoned public debate beyond the traditional focus on aggregates" (HDR, 2007, p. 224).

Importantly, the HDI normalizes its data across countries in two ways. First, using purchasing power parity, the value is normalized. Second, using GDP per capita shifts the focus to the individual as the unit of measure, rather than looking at country aggregates. A feature of the HDI is that its particular component indices capture a sense of community cohesion, the level or degree of social capital (Carilli et al., 2008), to aid in approximating the country's *bounded potential*, as well as that of the individual (HDR,1990; Sen, 1997; H. A. Simon, 1997).

Well defended as a goal in and of itself, human development directly enhances the capability of people to lead worthwhile lives (Sen, 1997), so there are immediate gains in what is ultimately important, while safeguarding similar opportunities for one's neighbor, and for the future. A country that enjoys high human development, such as the United States, has nearly limitless 'boundaries' on its potential for innovation and progress on many fronts from military to the arts. Citizens who suffer from low literacy rates, poor health, and extreme underemployment, in a country scoring low on the HDI, are effectively *bounded* by today's struggle for food and shelter (Sachs, 2005; H. Simon, 1972). Others utilize similar variables to gauge governance quality (La Porta et al., 1999). "We measure the output of public goods by infant mortality, school attainment, illiteracy, and [by] an index for infrastructure quality" (Anand & Sen, 2000, p. 237).

> There is hardly any example in the world of the expansion of education and health being anything other than monotone: good education and good health seem to generate powerful demand for these opportunities (and more) for our children. This is a relationship that goes well beyond the redistribution of income to the poor at a given point of time important though that is. It should also be noted that any instrumental justification for human development…relates concretely to people's ability to generate for themselves the real opportunities of good living (p. 237).

Sen wrote the following in the *Forward* for the 2009 HDR. "In 1990 public understanding of development was galvanized by the appearance of the first Human Development Report….it had a profound effect on the way policy-makers, public officials and the news media, as well as economists and other social scientists, view societal advancement" (p. iv). "While the concept of human development is much broader than any single composite index can measure,

the HDI offers a powerful alternative to income as a summary measure of human well-being" (HDR, 2007, p. 225). For the reasons cited above, and, because the HDI is an amalgam of component indices that approximate the entirety of development attained by the respective country and year (HDR, 1990), the HDI is the best measure available for the stock of development and governance. For this thesis, these factors are the stock of capability in the pre-test year HDI_{1990}.

To summarize, governance refers to the system, structure, and form of government including its actors, as well as the act of governing or the method by which a system is governed. For the purposes of this thesis, governance is limit to the influence, official or unofficial, that affects the legitimate, national-level, public sector, institutional, political, and policy systems. Its actors include public and private institutions, public officials, and private citizens transacting in the democratic process. Since its influence commands respect and allegiances in society and among its actors, governance affects the economy.

Corruption as a Dimension of Governance

The social sciences literatures qualify corruption by type or characteristic. Moody-Stuart (1996, p. 19) uses the definition for corruption found "in the Encyclopedia of the Social Sciences: Corruption is the misuse of public power for private profit." He "distinguish[es] between "grand corruption," which involves senior officials, ministers, and heads of state, and "petty corruption",…which is usually about getting routine procedures followed more quickly." Emphasizing the criticality of the difference, he states the following. "But grand corruption can destroy nations: where it is rampant, there is no hope of controlling petty corruption" (p. 19). It is the effects of 'nation-destroying' corruption that we seek to understand and measure in this thesis. Joseph Nye (1967, p. 419) defines and characterizes corruption in the following way.

> Corruption is behavior which deviates from the formal duties of a public role because of private-regarding (personal, close family, private clique) pecuniary or status gains; or violates rules against the exercise of certain types of private regarding influence. This includes such behavior as bribery (use of a reward to pervert the judgment of a person in a position of trust); nepotism (bestowal of patronage by reason of ascriptive relationship rather than merit); and misappropriation (illegal appropriation of public resources for private-regarding uses).

Nye continues by stating that corruption may be beneficial to economic development, governmental capacity, and institutional integration into the political arena. As such, increasing its transparency and legitimacy, or authorizing those aspects beneficial to society and public welfare may be the way to ameliorate corruption (pp. 419, 427).

While these definitions are widely accepted, each limits the scope of corruption to a political realm or public sector, which will not do for the purposes of this thesis. Robert Merton, on the other hand, suggests that corruption may be a remedy created by society; "*functional deficiencies of the official structure generate an alternative (unofficial) structure to fulfill existing needs somewhat more efficiently*" (1968, pp. 127, emphases in original). We seek to measure the effects of corrosive, development-limiting corruption in this thesis, whether public or private, if it

alters the composition of government expenditure by avoiding the democratic process or by influencing budgets or spending (Mauro et al., 2002, pp. 263-265).

Governance corruption refers to corruption in the system, structure, and form of government including its actors, as well as the act of governing or the method by which a system is governed. Its actors include national-level public and private institutions, or public "officials and private citizens who pursue private interests by circumventing the democratic process" (Thompson, 2007, p. 2). Therefore, in this thesis, governance corruption includes the scope and breadth of influence, official or unofficial, that affect a distortion into the legitimate, national-level, public sector, institutional, political, and policy systems (North, 1991a; deLeon, 1993; Mauro, 2004; Kaufmann et al., 2008) that command respect and allegiances in society and, therefore, on the economy itself (Rose-Ackerman, 1978, 1999; North, 1991a).

Examples of inferior, as opposed to good, governance raise the question about the cause of the failure in governance. Strictly defining corruption, however, forces bounds on the word as if corruption is merely a movement in character or form of a thing (or person) from point A toward point B. Instead, corruption is not linear, and it is more than one adjective can describe.

Corruption is a process, thus, it must be viewed in its context. Corruption must be evaluated for its effects; measured, then re-examined for its causes - as a cyclical rather than linear movement. In context, corruption may be temporarily beneficial, as in composting to build nutrient rich soil. In context, corruption may be necessary to reach a mutually desired societal goal (Rose-Ackerman, 1999a). Corruption in the proper context may fill a societal need or promote economic development, and outside the proper context, may destroy a nation (Merton, 1968; Moody-Stuart, 1996; Nye, 1967). According to Nye (1967, pp. 419-422), corruption has potential development benefit in three major categories: economic development, national integration, and governmental capacity. "If corruption helps promote economic development which is generally necessary to maintain a capacity to preserve legitimacy in the face of social change, then (by

definition) it is beneficial for political development" (p. 419). Corruption may further economic

development by the cutting of red tape, through capital formation, incentivizing entrepreneurship,

and overcoming discrimination. Corruption may further governmental capacity, as well. "The

capacity of the political structures of many new states to cope with change is frequently limit by

the weakness of their new institutions and (often despite apparent centralization) the fragmenta-

tion of power in a country. Moreover, there is little "elasticity of power" *-i.e.,* power does not

expand or contract easily with a change of man or situation" (p. 421. parentheses in original).

Tanzi (1998, pp. 581-582) echoes Nye's assertions that corruption may benefit a development by

citing "Tullock (1996) and Becker and Stigler (1974)…Baumol (1990) and Murphy & Shleifer,

and Vishny (1991)."

In Gupta et al. (2000) we read the contradictory claims about the economic benefits of

corruption. Some, consistent with Nye (1967), claim it is beneficial as method to "overcome and

overly centralized and overextended bureaucracy, red-tape, and delays (Leff, 1964: Lui, 1985)"

(p. 7). On the contrary, citing "Pradhan and Compos (1999) and Wei (1997) (p. 8)," as well as

"(Kaufmann and Wei, 1999)…and the 1997 World Development Report", Gupta et al. suggest

the "efficient grease hypothesis is not supported by data" (2000, p. 7). While evaluating corrup-

tion further is outside the scope of this thesis, defining and measuring corruption is necessary, and

requires the reader to know its context. Part of corruption's context is its form and the level at

which it operates.

Forms, Size, and Scope of Corruption

Corruption has many meanings in the literature. Corruption is a struggle between public

good and rent-seeking individuals, and is a principal inhibitor of economic growth and economic

development (Abed & Gupta, 2002a; deLeon, 1993; Heidenheimer & Johnston, 2002; Johnston,

2007; Mauro, 1995; Rose-Ackerman, 1999b; Rotberg, 2005). In *Thinking About Political Cor-*

ruption, deLeon (1993, pp. 23-25) offers several methods to categorize corruption. For example,

Lowi differentiates corruption based on its scale, where *Corruption*, "Big C," such as that in the Iran-Contra affair, is "often justifiable" by the participants, and requires coordination among many parties. Spelled with a little C, Lowi's *corruption* is small-scale scandal, "'that reflects or contributes to individual moral depravity'…[such as] embezzlement, tax evasion, or special privileges of office " (as found in deLeon, 1993, pp. 23-25). Heidenheimer colors corruption black, white, or gray, depending on the probability that a majority consensus would find the acts punishable based on principle, tolerable, or meet mixed review based on the class or status, respectively (quoted in deLeon, 1993, pp. 23-24). Rose-Ackerman (1999b, p. 27) distinguishes corruption by its scale, as well, where "'Grand Corruption' occurs at the highest levels of government and involves major government programs and projects" providing examples such as cartels and privatization processes rife with bribery (Rose-Ackerman citing Moody-Stewart (sic), 1997). Dennis Thompson (2007, p. 2) separates the broader concepts of individual and institutional corruption, stating that institutional corruption is not just the "stark land of bribery, extortion, and simple personal gain," but also "the shadowy world of implicit understandings, ambiguous favors, and political advantage." Thompson follows with, "identifying and assessing this kind of corruption depends critically on understanding the purposes of the institutions in which it takes place" (p. 2). Finally, deLeon & Green (2004, p. 72) move beyond the view of identifying the actor to add the concept of pervasiveness of corruption; whether or not it is "*systemic.*"

Narrowing the literature by the form, level, or size of corruption is fruitless, as corruption is crosscutting through political, institutional, business-level, and governmental red tape. Big Corruption, Grand Corruption, and espionage, or little corruption, scandal, barter, and petty thievery; none of these accounts for the percent of GDP unaccounted for because of corruption, by any name. Dissecting corruption by form, level, or size is insufficient for this thesis, as the form of corruption does not necessarily inform the measurement required, nor does it inform the size of the overall corruption problem as it is relative to the GDP in a country. Broadening the literature,

however, to include the scope of corruption, considering the degree to which corruption is systemic is constructive toward understanding and measuring of its impact (deLeon & Green, 2004).

One avenue scholars select to isolate the effects of corruption is to differentiate between that productivity that is reported and official, versus that which is not, regardless of scope, scale, color, and size. While this method offers more quantifiable data, it blurs the boundaries of the conventional definitions of corruption found in public affairs literature. Rent seeking and state capture are examples of the unofficial productivity.

The seminal author on government privilege-seeking or protection-seeking is Gordon Tullock (1967), who suggests that tariffs (p. 225), regulation protection (p. 226) monopoly concessions (p. 228), transfers (such as favor by pressure from lobby groups) (pp. 228, 232), and barriers to entry (pp. 231) are forms of theft from the government's revenue stream. Anne O. Krueger (1974) penned the term *rent seeking*, and added as varieties, "bribery, corruption, smuggling, and black markets" (p. 291), import restrictions (p. 298), quotas, license-allocation, fair trade and minimum wage policies (p. 301), credit rationing , and preferential tax treatment (p. 302). Usage of the term 'rent' stems from Smith's (1776) account. "Wages, profit, and rent, are the three original sources of all revenue as well as of all exchangeable value. All other revenue is ultimately derived from some one or other of these" (p. 54). "All taxes and the [government] revenue which is founded upon them…are ultimately derived from some one or other of those three original sources of revenue…" (p. 55). "Rent seeking," according to Tullock, is "the outlay of resources by individuals and organizations in the pursuit of rents created by government" (1993, p. 2). Consistent with Krueger (1974), Smith (1776), and Tullock (1967), asserts that rent seeking causes a "net waste of resources in inefficient production" (p, 228), it lowers government revenue, and diminishes official taxable individual and corporate income (p. 229). Krueger (1974) adds, "[d]iminishing returns will reduce the [labor] wage. The domestic price of imports, the distributive margin, and the [profit] wage of distributors will increase" (p. 297).

State capture is any group or social strata, external to the state, that exercises decisive influence over state institutions and policies for its own interests against the public good" (Pesic, 2007, p. 1). A form of grand corruption, it includes the ability of domestic or foreign informal institutions or firms to mold or manipulate state laws, policies, or regulations (Kaufmann, 2003, p. 21). At the highest level, officials setting public policy change or break rules to favor certain vendors, buy votes, or bargain for power (Chua, 2006). Essential to this thesis, Mauro, Abed, et al. (2002, p. 278) assert that extorting from education starts before the budget approval, so fewer dollars are allocated to education, and more are allocated to projects where that extortion is easier to hide.

La Porta &Shleifer (2008, p. 7) concentrate their research on the difference between formal and informal firm productivity, using 14 African and 14 Latin American countries as the sample set, and OLS regression with data from informal surveys, educational attainment, and economic data. Raw materials, production costs, and electricity are the supply-side variables, while sales, GDP, and output are the demand-side variables. The individual is the unit of measure, and the variables are normed to this. This method of approximating the size of the informal economy would have satisfied the needs and purpose of this thesis; however, as of yet, the data are not available for the sample set of countries in Eastern Europe. La Porta & Shleifer, (2008, p. 7) "group the determinants of the size of the unofficial economy into three broad categories: the cost of becoming formal, the cost of staying formal, and the benefits of being formal." Many of the 'costs' of becoming and staying in the official economy are measureable, and belong with state capture and rent seeking, in the shadow economy.

Similarly, to account for the corruption's effects on GDP, Schneider et al. (2010) use the term "*Shadow Economy*" (SE) to separate official and unofficial dealings. Shadow suggests that the unofficial activity is obscured or hidden, and better defines the productivity this thesis seeks to measure. "The shadow economy is an unobservable economic phenomenon, and no consensus

exists as to the definition of the shadow economy" (Buehn & Schneider, 2009, p. 5). Consistent with Dresher, Kotsogiannis et al. (2005), employing a multiple indicator, multiple causes (MIMIC) structural equation method. Since this is the only data set available that approximates the size of the informal economy that also covers the countries of interest herein, this thesis uses the Schneider data set, and the following definition for the shadow economy (Schneider et al., 2010, p. 3).

Shadow Economy Rules

> The shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities for any of the following reasons:
> (1) to avoid payment of income, value added or other taxes,
> (2) to avoid payment of social security contributions,
> (3) to avoid having to meet certain legal labor market standards, such as minimum wages, maximum working hours, safety standards, etc., and
> (4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.

Assuming that either productivity is reported or it is not reported is naive, however, adding that which we know to be reported with that which we can estimate to be unreported is a closer, though still problematic, approximation of the total GDP per country (Galbraith & Kum, 2005; Schneider et al., 2010a).

Causes and Consequences of Corruption

The state's institutional environment is cooperatively managed through the highest-level authority of its governance processes. Governance performance can be measured by its ability to control corruption, which is particularly threatening to both aggregate and individual prosperity (Mauro et al., 2002). "Corruption is likely to be a symptom of wider institutional failures…" (Kaufmann, 2006, p. 98), and may hinder the accumulation of knowledge and technical capital and economic growth (La Porta & Shleifer, 2008).

An overview of corruption around the world shows that many of its most commonly cited causes and consequences are thought to be economic in nature (Tanzi, 1998, p. 587). Mauro cites

causes related to rent-seeking through subsidies, price controls, and trade arbitrage, influence re-lated to trade restrictions or protectionist tariffs, and incentives or bribery stemming from low wages of civil servants, and other societal factors such as ethnolinguistic fractionalization and family ties (Mauro, 2000, pp. 4-6). Informal economic activity that operates outside of the formal economy has many pseudonyms including, but not limits to, three arenas, which may overlap. Recall that corruption's equilibrium necessarily allows benefit or gain for a portion of the actors. (1) The first is exchange of products and services (*e.g.,* unofficial, underground, unobserved, un-reported, undeclared, non-transparent, informal, hidden, shadow, illegitimate, barter, cash, parallel, secondary, black, and gray economies or markets, of transactions that are on the ground versus on the books) (Feige & Urban, 2008; Schneider et al., 2010a, p. 3); Eurostat uses NOE, non-observed economy (Eurostat2011c). (2) Second is the trading for some sort of favor (*e.g.,* lobby and special interest groups, Political Action Committee[PACs], labor unions, mafias, car-tels) (North, 1990). This includes "State capture," which is the ability of domestic or foreign informal institutions or firms to mold or manipulate state laws, policies, or regulations) (Kauf-mann, 2003, p. 21). (3) Thirdly, some gain by (or through) the trading of knowledge (*e.g.,* espionage, trade secrets, copyright infringement, scientific breakthrough, or reason). These mar-kets fall into the broader sphere of corruption of the formal governance system (deLeon, 1993; Mauro, 2004b; Rose-Ackerman, 1999b; Schneider, 2009).

Werlin (1994, p. 554) states that corruption…"arises out of the inadequacy of political software (persuasive power), particularly the distrust of governmental institutions" and, "…has a corrosive effect on the requirements for development" (2000, p. 182). Weak, formal, legitimate systems, ineffective political hardware (contracts, procedures) and influential institutions are symptoms of poor state management, or ineffective governance. Quoting Joseph Nye (1967), corruption seeps into the social, governmental, and political realms - it flourishes with "the weak-ness of social and governmental enforcement mechanisms; and the absence of a strong sense of

national community…[and the] weakness of the legitimacy of governmental institutions" (p. 418). Regarding "the type of change which seems to be occurring in our age ("modernization") … [and to] the capacity of political structures and processes to cope with societal change," Nye states:

> [Modernization in the United States, or its] development (or decay) will mean growth (or decline) in the capacity of a society's governmental structures and processes to maintain their legitimacy over time (*i.e.,* presumably in the face of social change). This allows us to see development as a moving equilibrium and avoid some of the limitations of equating development and modernization.

As for consequences of corruption in the public sector, businesspersons see bribes as a form of tax, which increases prices. In *Corruption and the Composition of Government Expenditure*, Mauro finds "…evidence of a negative, significant, and robust relationship between corruption and government expenditure on education, which is a reason for concern, since previous literature has shown that educational attainment is an important determinant of economic growth" (1998b, p. 277). Some forms of corruption have terminal consequences. "Under totalitarian regimes, corruption is often directly linked to human rights violations," asserts Pope in Transparency International's (TI) *Confronting Corruption* (2000b, p. ix).

Solving the causes of corruption question is vast beyond the scope of this thesis, and the consequences are far reaching, equally far outside its scope. Merton (1968, p. 130) asserts that the 'demand for services of special privileges are built into the structure of society." As deLeon reminds readers, "It is sown in Corruption" (quoting 1 Corinthians 15:42, 1993, p. 3). As such, "where it is rampant, there is no hope of controlling petty corruption" (Moody-Stuart, (1996, p. 19). It is the corruption that avoids the democratic process that we seek to mute (Thompson, 2007).

The important point upon which scholars agree is that a layer of activity runs parallel to the formal system of government, and it attempts to avoid detection. The corruption that is measurably absent from the National Income Accounting revenue steam, and therefore, is missing

from official GDP reports, is corruption as a *dimension of governance*. In this thesis, this layer is called *governance corruption*.

Corruption's Remuneration

Corruption's remuneration is "some type of significant personal gain, in which the currency could be economic, social, political, or ideological" (deLeon, 1993, p. 25). Its value could lie in "the shadowy world of implicit understandings, ambiguous favors, and political advantage" (Thompson, 2007, p. 2). "We should not expect to find a sharp distinction between corruption and non-corrupt actions. Instead, we will find the gradations of judgment, reflecting a variety of equivocations, mitigating circumstances, and attributed motives" (Johnston, 1986, p. 379). Corruption may be the act of an individual, or of a group or institution, to gain power, prestige, or position. *The IMF and Good Governance* (2011d, p. 1) factsheet states, "…corruption thrives in the presence of excessive government regulation and intervention in the economy; substantial exchange and trade restrictions; complex tax laws...tax incentives, zoning laws…and monopoly rights over exports and imports…(and poor) remuneration of the civil service." Power is a potential pay-off for corruption (Nye, 1967, p. 421). Institutions gain respect because of the *power* they wield (Kooiman & Jentoft, 2009, p. 883; Mauro, 2004b; Schneider & Enste, 2002). "Power is inherent in governance" and shapes the capacity of governments and institutions to govern (Kooiman & Jentoft, 2009, p. 833). Good governance fosters the power of the state, while bad governance allows corruption to flourish, and nurtures informal activity. Some scholars assert that certain environments invite corruption, such as where monopoly power is in the hands of officials, when the risks of getting caught are low and penalties are mild (Klitgaard, 1988; Rose-Ackerman, 1978). Other scholars assert that corruption can be predicted by "patterns of potential inducements or sanctions…[and the] structure of opportunities and incentives" (Sandholtz & Koetzle, 2000, p. 36).

Since corruption's *remuneration* is "some type of significant personal gain, in which the currency could be economic, social, political, or ideological" (deLeon, 1993, p. 25), it is important to understand how scholars measure corruption in order to measure its impact on economic growth, living standards, and income inequality.

Controlling Corruption

Interestingly, correcting the imbalances that cause corruption must be as multidimensional as the corruption itself. "Any realistic strategy must start with an explicit recognition that there are those who demand acts of corruption on the part of public sector employees and there are public employees willing for a price to perform these acts. There is thus both a demand for and supply of corruption" (Tanzi, 1998, p. 587), and responsibility for acting illegally or unethically resides on both sides of corruption's equilibrium, which calls for horizontal accountability (Kaufmann, 2006). Mauro states, "[s]ince much of public corruption can be traced to government intervention in the economy, policies aimed at liberalization, stabilization, deregulation, and privatization can sharply reduce the opportunities for rent-seeking behavior and corruption" (2000, p. 6). Rose-Ackerman suggests several successful anti-corruption projects as models for overcoming corruption of varying types, and case studies substantiate her theory that clean-running and stable governments are a key precursor to equitable, effective, and efficient economic growth that target both the supply and demand (Klitgaard, 1988; Rose-Ackerman, 1999b; Shleifer & Vishny, 1993). Policies aimed at curbing incentives for corrupt activity may be simple; increasing the penalty when caught, and/or increasing the law enforcement to catch it (Boswell & Rose-Ackerman, 1996), for example. While Thompson (2007) agrees on the mechanisms and that discovery should take place within the institutional form rather than in a criminal court, he asserts that the institutional complexity of governments must undergo structural reform in order to reduce corruption.

Increasing the risk of exposure may help, especially as in political corruption. Transparency International (TI) created the national integrity system to make undertaking corruption a "high risk and low return" endeavor (TI, 2000b, p. ix). TI suggests that the best method to "control the cancer of corruption" is to increase both enforcement and prevention by using the national integrity system, which is "a system of checks and balances designed to disperse power and limit situations conducive to corrupt behavior" (2000b, p. xiii). Policies that affirm Freedom of Press, Freedom of Information, civil liberty protection and election oversight are critical when building a transparent governance (2000b, p. xxv). Transparency is critical in the private sector to reduce "capture" and increase foreign investment, calling for policies to further accountability in corporate ethics and traditional legal and judicial reforms that focus on timely information, auditing, insider rules, and financial disclosure (Kaufmann, 2003, p. 21).

"Corruption levels are determined by the overall *level* of the benefit available" (Boswell & Rose-Ackerman, 1996, pp. 84, emphasis in original). Decreasing corruption's available benefit is multidimensional, a task the World Bank took on in its "Multi-pronged strategies for Combat Corruption: Addressing State Capture and Administrative Corruption" (2000a, p. 39). The World Bank's framework starts with five major areas of focus listed next. Where novel approaches beyond those mentioned above exist, those are listed, as well. (1) Institutional Restraints: independent prosecution and enforcement. (2) Political Accountability: Transparency in party financing, asset declaration, and conflict of interest rules. (3) Civil Society Participation: public hearings in the drafting of laws. (4) Competitive Private Sector: Monopoly regulation. (5) Public Sector Management: Merit based pay for civil service, customs oversight (ch. 4).

Another vein of literature discusses increasing vertical and horizontal accountability by both state and non-state actors (UNDP, 2010e). Peer-level whistle-blowing protection and stakeholder groups are examples of horizontal accountability. From state actors, access-to-information laws are an example of vertical accountability (Relly, 2011).

Consequences of Corruption on Development

Mauro (2000, pp. 4-6) following Nye (1967, pp. 421-423) cites several consequences of corruption. Corruption "lowers investment and retards economic growth to a significant extent, talent may be misallocated, [it] may reduce the effectiveness of aid flows, bring about loss of tax revenue." Pertinent to this thesis, Mauro (2000, p. 7) asserts, "[c]orruption may distort the composition of government expenditure…. [b]y reducing tax collection or raising the level of public expenditure, corruption may lead to adverse budgetary consequences, [and] lead to lower quality of infrastructure and public services."

Citing empirical evidence from the former Soviet Union, Adeb & Gupta found that the "…disintegration of the command structures in the old regimes triggered some of the most chaotic economic, political, and social changes in modern history. Absence of the rule of law and accountable systems of governance led to rent-seeking, corruption, and outright thievery" (Abed & Gupta, 2002b, p. 2). Kargbo (2006) writes of corruption that has hurt both aggregate (official production) and individual income in Africa. "Corruption leads to the decline in real per capita incomes, inflation, a widening budget and balance of payment deficits, and declining official production and exports" (p. 8). He reports, "[c]orruption has also led to massive neglect of the social sector, which has substantially decreased the quality of human resources in African states over the years" (p. 8). Specific to this thesis, "[t]he provision of educational and health opportunities have been limited, thus impacting negatively on the quality of life, labour, productivity, incomes, innovativeness, competitiveness, and poverty reduction in Africa States" (p. 8). The *IMF Factsheet* adds to the body of evidence on the relationship between corruption and education funding (IMF, 2011d, p. 1).

> Corruption can reduce investment and economic growth. It diverts public resources to private gains, and away from needed public spending on education and health. By reducing tax revenue, corruption can complicate macroeconomic management, and since it tends to do so in a regressive way, it can accentuate income inequality.

Transparency International (TI) (2009b) and Mauro (2000) discuss corruption within the public education budget's system of allocation. "Countries with high levels of corruption invest less in public services, leaving the education sector under-funded" (p. 6). UNESCO reports that "between 10 and 87 percent of non-wage spending on primary education is lost" to "resource leakages" in the execution of the budget (Hallak & Poisson, 2007, p. 105). Mauro (1998, p. 277) presents "evidence of a negative, significant, and robust relationship between corruption and government expenditure on education." Finally, Mauro (2000, p. 6) states the following about incentive to divert funds away from education in the budgeting and allocation process:

> Corruption may distort the composition of government expenditure. Corruption may tempt government officials to choose government expenditures less on the basis of public welfare than on the opportunity they provide for extorting bribes…. education turns out to be the only component of public spending that remains significantly associated with corruption when the level of per capita income in 1980 is used as an additional explanatory [control] variable.

Measuring Corruption - Indirectly

Vito Tanzi (1998, p. 577) asserts, "[w]hile there are no *direct* ways of measuring corruption, there are several indirect ways of getting information about its prevalence in a country or in an institution," including published reports such as newspapers, case-studies, empirical country-level data, and questionnaire based surveys (emphasis in original). The most prevalent method is the survey method. The World Bank and European Bank for Reconstruction and Development (EBRD) created the Business Environment and Enterprise Performance Survey (BEEPS) in 1999, and it is in its fourth iteration. The 2008 round conducted over 11,000 surveys of business owners and top managers on business climate and corruption. Data are available on 26 countries in Eastern Europe. While a strength of the BEEPS is in survey data specific to corruption, it is limited to surveys of firms and employees of those firms about corruption in the business environment (BEEPS, 2008a). Therefore, it is not sufficient in scope for this thesis. The EBRD has published thematic Transition Reports yearly since 1994. In 1998, the theme was "Ten Years of Transition" (EBRD, 2010i), and the report included results from several surveys, and macroe-

conomic data for the transition counties backdated to 1989. With the backdated data, the EBRD dataset for is a sufficient source for eight of the seventeen variables on twenty-three of the thirty countries on which this thesis focuses. The variables that are not part of the EBRD dataset include those in the Human Development Index and the component indices, Education Attainment Index, Life Expectancy Index, and Gross Domestic Product Index, which together make up eight variables, this poses no problem, as the HDI variables are each available from the HDR for each country. However, the two variables on which rest the key hypothesis in this thesis are not part of this data set: (1) Government Expenditures on Education as a percentage of Total Government Spending, (2) a measure for unofficial GDP per capita as a percentage of total GDP per capita. Since testing both of these variables requires macroeconomic data consistent and normalized with that of the World Bank and IMF, the EBRD data cannot be used in this thesis. EBRD in Transition Report 2010 concludes the following regarding its own measure for progress.

One problem is the subjective nature of the scoring and possible non-transparency of the demarcation between categories…. This is because [the data] cannot be easily validated externally and creates a risk that a country's overall economic performance might influence the judgment about (and scorning for) its transition progress (which, in the extreme, would render regressions of growth on the transition indicators meaningless) (p. 2).

The EBRD continues describing its fundamental concern with measuring economic progress using this (or presumably other, similar) datasets.

A more fundamental objection is that, with the exception of the infrastructure indicators, many of the scores reflect a rather simplistic view that a successful transition is mainly about removing the role of the state and encouraging private ownership and market forces wherever possible. The problem with this view is that markets cannot function properly unless there are well-run effective public institutions in place. (p. 2)

45

Several widely used surveys on the perceptions of corruption in the private sector and at different levels of government are available. Transparency International's (TI) Corruptions Perceptions Index (CPI) is one such survey. "The 2010 CPI measures the degree to which public sector corruption is perceived to exist in 178 countries around the world. It scores countries on a scale from 10 (very clean) to 0 (highly corrupt)." However, the article continues, "[g]iven its methodology, the CPI is not a tool that is suitable for trend analysis or for monitoring changes in the perceived levels of corruption over time for all countries" (CPI, 2010b, p. 5). TI's Global Corruption Barometer uses similar methodology (GCB, 2009), and is a wealth of information, by country, on the scale, type, causes, consequences and true accounts of corruption, but offers no measurement of it relative to GDP (GDR, 2009c), as that is not its purpose.

The Cost / Benefit Analysis (CBA) allows one to value the implicit and explicit costs of corruption using empirical and survey data (Sen, 2000). Kaufmann (2006, p. 81) suggests that, "Corruption can, and is being, measured in three broad ways: (by)... gathering the informed views of relevant stakeholders...tracking countries' institutional features (and by)...careful audits of specific projects." Together, the CBA and national income accounting tools can estimate the portion of funds that are unavailable domestically due to corruption by budget line item and do so with statistically significant precision. This precision increases, and costs become increasingly explicit as more nations practice standardized accounting methods (IMF, 2011, p. 1; D. K. Gupta, 2001; Weimer & Vining, 2004). However, National Income accounting practices are yet inconsistent between countries and links between social and professional research are lacking, requiring us to abandon the CBA method for this thesis (Feige & Urban, 2008). For an example of the chasm rendering the CBA unproductive for the method herein, deLeon (1998) attempts to "chart a middle course" between the positivists and post-positivists representing respectively the purely quantitative and purely qualitative method extremes (p. 111). To elucidate the division, deLeon affirms the post-positivists argument "that too often the policy analyst is well removed

from the political and value conflicts inherent in public policy" thereby making difficult the bene-

fit assessment. However, the positivists "play an important role in policy analysis, for it is by us-

using many of these quantitative techniques that they can propose with some rigor a clear-cut set

of expectations necessary for prediction purposes" (p. 110). Further, in Weimer's (Weimer,

1998, p. 118) words, "one would be hard-pressed to find any important public policy decisions

that were made solely on the basis of cost-benefit analysis" (quoted in deLeon, 1998, p. 108).

Several scholars critique the MIMIC method used by Schneider et al. (2010) asserting

that the variables used in the MIMIC equation are "highly correlated with each other" (Breusch,

2005; La Porta & Shleifer, 2008, p. 8), possibly exaggerating the estimated size of the informal

economy, and that the benchmarks are subjective. Recall also, that correlation coefficient be-

tween the electricity demand method, currency demand, key perceptions indices and structural

equation methods, is .88 or greater (S. Gupta et al., 1998, p. 12), so the concern runs across the

potential methods. Addressing the subjectivity of the benchmarks, Schneider and other scholars

collaborate with Bruesch to arrive at a calibrated benchmark that holds a "proportional relation-

ship between the measurement in different years" (Dell'Anno & Schneider, 2006, p. 9), avoiding

overstating the percentage of the Shadow Economy. Schneider et al. (2010a) counter with the

following statement, regarding the MIMIC (Multiple Indicators Multiple Causes) model.

[T]his is the first study that applies the same estimation technique and almost the same

data sample to such a large number of shadow economies…[using] the MIMIC estimation meth-

od for all countries, thus creating a unique data set that allows us to compare shadow economy

data. (p. 3)

According to the IMF scholars on corruption estimation, "…little is known about the de-

velopment and the size of the Shadow Economies in developing Eastern European and Central

Asian countries… in the recent past" (2011d, p. 1). The criticism by Bruesch relative to this the-

sis is the suggestion that the MIMIC model *may* overstate the actual Shadow Economy

percentage. However, other scholars assert that corruption accounts for far more of the economic activity than studies to date have realized or uncovered (Levy, 2007). Since the size and scope of the MIMIC technique and study of national-level government and institutions is revolutionary and methodologically unmatched, it therefore, is the measure employed for the methodology in this thesis (See MIMIC diagram in Appendix).

Theoretically, the relationship between corruption and the Shadow Economy is thus un-settled. There is, however, reason to believe that the relationship might differ among high and low income countries (F. G. Schneider, 2009). Others assert that the relationship is complex, depending on the maturity of the government, and the quality of governance (La Porta & Shleifer, 2008). Recent literature asserts that corruption and the Shadow Economy are *substitutes* when corruption is high, and *complements* when corruption is relatively lower, supporting the need to measure them separately in a simultaneous equation model (Buehn & Schneider, 2009; Dreher, Kotsogiannis et al., 2005; Russell, 2010).

Economic Growth

The business cycle literature is foundational for understanding the effects of corruption for two reasons. First, much of the business cycle literature precedes the economic growth literature chronologically, and more importantly, it is referenced frequently in the latter. Second, this thesis pivots on the political lightning bolt – the end of the Cold War. Baumgartner & Jones (1993) call this non-incremental change a 'punctuation' in society's equilibrium or stasis (p. 23). A watershed event, this demarcation was a catalyst for a new business cycle and economic growth stage for many Central and Eastern Europe countries (Rostow, 1991). The economic growth literature underscores the criticality of education funding in economic policy development and of this thesis by underscoring required to build strong, healthy, and viable economic development today, with tomorrow's staying power. In *Innovation: The New Pump of Growth*, Paul Romer asserts that it is the application of knowledge through an educated workforce such as highly trained scientists and engineers who are to credit for past economic growth, and that growth has proven to be unsustainable in countries around the world without sufficient public support through funding and public policy (Romer, 1998b). Developing this argument begins with an understanding of the business cycle.

The Business Cycle – the foundation of economic growth stages

Business cycle literature falls into two major categories, the *how* cycles work -- their identification and measurement, and, the theories on *why* -- or their cause. From here, the literature divides again into endogenous non-linear and exogenous linear-multiplier, with some helpful bridges between them. This pattern repeats itself in the economic growth literature. Economic growth's reputation is on the line, as some claim it is economic growth itself that can exacerbate poverty or income inequality (*e.g.,* Galbraith, 2008; Rothschild, 1986; Pritchett, 1997), while others claim economic growth is required to alleviate both (e.g., Sachs & Warner, 1995; Sen, 1999; Barro 2001; Friedman, 1997). Either way, aggregate growth seems inevitable (Maddison, 2009);

furthermore, *growth* is merely a measure of the change in annual official GDP output, so culpability or credit belong to the causes of change. Complicating the equation, both sides may still be right, if given identical data and definitions, the time span pivots on different events or cycles (Galbraith & Kum, 2005; Pritchett, 1997; Rostow, 1991).

Early work on business cycles focused on identification and measurement and questioned whether movement equals a cycle or an aberration. What magnitude of change constitutes a statistical oscillation rather than a cycle? Is it repeated or at least periodic, continuous, intermittent, or patterned (Mitchell, 1928; Slutsky, 1929)? Regarding the naming of cycle names their durations, Juglar (1893), working on the credit crisis in France and later in the US, identified 8 to 10 year industrial cycles tied to the issuance of credit. Kitchin is credited for identifying the 3.5-year business cycle (1923, p. 10). Kitchin, Slutsky (1929), and Wright (1920), considered the short cycle's normal oscillations due to human psychology. Kondratiev identified half-century "long-wave" cycles (48 to 60 years) that incorporate several shorter waves (Kondratiev, 1926). Schumpeter solidified these three time-spans by the author's names -- Kitchin, Juglar, and Kondratieiv (1926) -- into the economic growth literature of today with his theory that each represents an innovation of different magnitude, exists simultaneously, and should be additive with revolutionary change creating a higher "steady state" (Schumpeter, 1939). Mitchell, in turn, tied a 4-year cycle to the effects of the political cycle and found two or three of these shorter cycles exist between Juglar crises (Glasner & Cooley, 1997, p. 347).

In a foundational work to the developing economic growth and governance theories, Rostow adds that the economic stages of development are logical, rational, and based on exogenous globalization and endogenous governance forces. Rostow (1991) found the pre-conditioning stages were roughly 15 to 20 years and the take-off stages were about 60 years, consisting of several interwoven growth spurts of varying lengths and magnitudes depending on the industries involved and the "spreading" effects of lateral interaction between industries. Kuznets

(1940) proposed a 15 – 20 year cycle consistent with the explanation of interim shorter cycles within larger growth phases and based on his own national income research. Burns & Mitchell (1946) developed a definition for the business cycle, which is the duration in months from trough to trough when measuring the rate of change of productivity; this set the standard for other countries. Note the identification of a standard: *a trough marks a cycle*.

After working out the statistical problems with the counter-cyclical (and therefore, the canceling-out) nature of supply and demand forces within aggregate indexes, from these divergent camps based on theory, come a general agreement that economies *do* cycle. Given that economies cycle, one may ask *how* the economy cycles, referring to the initial date, degree, and duration of the cycle. This elevates the pertinent question to *why* – why do economies cycle?

Following Keynes' (1936) lead on why economies cycle and why they grow, many economists modeled endogenous causes with some type of oscillator such as income/expenditure (Samuelson, 1939), income/savings (Kaldor, 1959), inventory (Metzler, 1941), trade (Hicks, 1950), and credit and money supply (Hayek, 1933). Some scholars added non-linear or "dynamic effects" (Goodwin, 1951), price signal, or information on intertemporal discoordination (Hayek, 1933), or time lags between acquisition and distribution (Kalecki, 1954), or the idea of a multiplier (Howitt et al., 1999). Other scholars, following Schumpeter and Kuznets, worked on exogenous causes such as structural change and entrepreneurial gains (Schumpeter, 1942), knowledge accumulation (Romer, 1996), shocks with a "ratchet effect" (Smithies, 1957), and technical change (Hicks, 1950; Solow, 1956).

Summarizing the review of business cycle literature - economies cycle. *Cycles are the effect*; cycles do not materialize out of a void; they have a cause. This critical point refers to Rostow's economic growth stages: *events demarcate and catalyze economic growth stages* (Pritchett, 1997; Rostow, 1975, 1991; Xu & Li, 2008). The cause(s) is (are) due, generally, to some influence or to a combination of endogenous, evolutionary change and exogenous revolu-

tionary shifts in the steady state (Ofer, 1987; Schumpeter, 1942). Like the business cycle itself, "The Kuznets curve...emerges as a clear empirical regularity...." (Barro, 2000, p. 32). The estimated relationship may reflect not just the influence of the level of per capita GDP but also the dynamic effect; whereby, the adoption of each type of new technology has a Kuznets-type dynamic effect on the distribution of income (Barro, 2000). Business cycle research was a foundation for an explosion of attention on economic growth, which offers theories and models on *why* and *how* economies grow.

Economic Growth Theories

A country's economic growth, defined as a long-term change in capacity to supply increasingly diverse economic goods to its population (Kuznets, 1973, p. 247), is based on advancing technology and the institutional and ideological adjustments that it demands. Economic growth, generally, is the change in aggregate producing power, GDP, which is the amount of goods and services produced in an economy over one year. A negative change is negative growth. In addition, the "realized" growth rate is the total growth rate minus inflation. Kuznets (1940, pp. 259-259) elaborates on Schumpeter (1939), who distinguishes economic growth from economic development by the degree of change, where growth is incremental, evolutionary, and continuous and where development is characterized by "discontinuity of the steady-state...a disruption of the static equilibrium leading to an indeterminate future equilibrium" (Kuznets, 1940, p. 259). A consequence of evolving societies, increasing population, production of basic necessities, and reliance on incentive to spur on economic activity (Phelps, 2008; Schumpeter, 1939, 1942) both fuel and are fueled by inflation; what Rostow (1991) called the "compound interest" of an economy (pp. 4-6). The staying power of a new steady state requires constant progress in the pre-conditions to it, in infrastructure and social capital (Putnam, 2000). Staying power also requires the foresight to invest in those factors that will be valuable in the future both for con-

sumption and demand for exports (Krugman, 2000; Rostow, 1991). It is critical to assessing the quality of the economic development ex post facto.

After the development has occurred, analysts can see the evidence of healthy or unhealthy economic growth by an economy's ability to meet the needs of its citizens, and its customers. Citizens produce the inputs to GDP, the goods and services produced in a country in a year. In addition, citizens (and the additional world's population) are consumers, or customers, of that which is produced; if the product is desirable and the price is commensurate with its perceived value. For example, assume Country A and Country B both decided to increase GDP by pursuing additional shares of the world transportation market: Country A pursues the horse drawn carriage, and Country B, racecars. Even the finest horse-drawn carriage has a limited appeal in the local or world market, yet the price is relatively low. Likewise, even the latest, high priced and technologically advanced racecars have limited appeal, yet the horsepower is high. Both are in the realm of transportation, however, neither is meeting a high demand in the population. Neither provides the host country a sustainable industry nor creates a trading advantage. As indicated above, there must be a desirable product (with *high demand*) and a commensurate price and value in the international market to gain economic development strength. Neither the horse-drawn carriage nor racecar ideas would meet the current or future needs of the citizens or of the export markets. The sustainable economic development depends on the public officials' ability to forecast, based on foresight, the investment needs in infrastructure, education, training, research and development, and expertise to produce needed and desirable goods for the times; and to innovate and revolutionize to meet the challenges for tomorrow and for the world market (Nelson & Phelps, 1966, pp. 70-71).

In review essay of economic growth literature, Klenow & Rodriguez-Clare (1997) challenge researchers to complete four steps when assessing economic growth: (1) "more tightly link theory and evidence... (2) tie research to business cycles... (3) develop more theories of interna-

tional productivity differences... (4) and, collect detailed country data bearing on the process of technology diffusion" (Barro, 2001a; Klenow & Rodríguez-Clare, 1997, p. 597; Klingner & Sabet, 2005). The rationale for this thesis parallels Klenlow & Rodriquez-Clare's four-step challenge. First, the thesis accomplishes steps one and two by linking governance, economic growth theories, and individual income with stages of economic growth. Second, this thesis satisfies steps three and four by analyzing individual income as a measure of education value based on the staying power of economic growth in a sample of countries. New Growth Theory (NGT) is a theoretic umbrella over the four challenges above (Barro, 2001b; Klenow & Rodríguez-Clare, 1997). Stated differently, this thesis satisfies the challenges, capitalizing on NGT's treatment of education as fundamental to successful and sustainable development policy (Romer, 1998a).

Theories on the Causes and Types of Economic Growth

Two theoretical camps divide the economic growth literature based on causes (why), then further divide based on effects (how). The first camp asserts that exogenous forces cause economic growth, the second camp that endogenous change cause economic growth. The literature further divides, based on the effect of the growth; the two camps divide into four based on *how* economies grow. This latter division is centered on the path of growth –the "trajectory"; either individual incomes converge (the gap between the richest and poorest shrinks) or diverge (the gap between the richest and the poorest grows), or move in some combination of these paths over time. Each of these four major theoretical camps, two on causes (exogenous and endogenous) and two on effects (convergence and divergence), inform this thesis' study on the causes and effects, the *why* and *how*, of economic growth. This large literature is important to understanding the *nature* of economic development.

Neoclassical Growth Theory and Exogenous Growth Theory

Solow isolated key determinants of economic growth into the factors of production, technology, labor, and capital, isolating the growth attributed to each. His work laid the foundation

for Neo-Classical Growth Theory. From the literature on technical change grew the burgeoning literature on the rate of technology and innovation transfer, adoption, and diffusion as a measure of policy economic development and stability (Klingner & Sabet, 2005). Solow wrote, regarding the forty years ending in 1949, "[g]ross output per man hour doubled over the interval, with 87 ½ per cent of the increase attributable to technical change and the remaining 12 ½ per cent to increased use of capital" (1957, p. 320).

Consider the tremendous change and growth in the transportation industry, for instance, with the aid of automation. Fredrick Taylor (1911, p. 21) predicted this rapid change when applying the principles of scientific management, which include the "scientific education" and scientific skill training of workers toward the needs of the future, or to infuse the workplace with a "scientific knowledge" that promotes ingenuity. In scientific knowledge, the worker "is quickly given the very best knowledge of his predecessors; and, provided…with standard implements and methods which represent the best knowledge of the world up to date, he is able to use his own originality and ingenuity to make real additions to the world's knowledge, instead of reinventing things which are old" (p. 126). Rostow referred to this shift in economic growth stages, the shift from the "pre-conditions to take off" stage, to "take-off" (1991, p. 5).

Rostow stated, "whenever these principles are correctly applied, results must follow which are truly astounding" (p. iii). Clearly, a doubling (or 100 percent change) of the average person's productivity or output per hour over forty years is astounding, yet it makes sense in light of the assembly line's coming of age during the same forty years. Solow (1957) attributed 87 ½ percent of that doubling to technical change, one such type of change being automation (p. 320). Henry Ford produced 11 Model T cars in the first month of its production in 1909. Then, Ford automated its assembly line, implementing Fredrick Taylor's theories on Scientific Management (1911a). In 1910, 12,000 Model T cars rolled off the assembly line, and by 1925, 2 million Model Ts rolled off that line (Brinkley, 2003, p. 475).

Solow (1957) states that the remaining 12 ½ percent of the doubling of productivity per working hour over his forty-year study was due to the increased use of capital (p. 320). Ford built the Highland Park Ford Plant in 1913 to accommodate the Model Ts assembly line (Brinkley, 2003), an example of increased use of capital. Taylor writes on, "the same principles can be applied with equal force to all social activities: to the management of our homes; the management of our farms; the management of the business of our tradesmen, large and small; of our churches, our philanthropic institutions our universities, and our governmental departments" (1911a, p. 8).

Relying on a Keynesian foundation to apply external stimuli to an otherwise closed system, Solow's findings revived Keynes' work leading some scholars to isolate specific factors, while others focused on production disincentives (Howitt, 1986; Keynes, 1936; North, 1994). Working from these strengths, Exogenous Growth Theory specifically employs global technology advancement as the exogenous agent of growth (Hahn & Solow, 1997; Howitt, 1986, 1997). Either way, models of exogenous theories treat growth as the result of some external catalyst, neglecting part of the evidence, such as cycles inside the economies and additive or compound growth. Returns on endogenous factors (*e.g.,* interest, inflation, population or compound growth, incremental knowledge gains over time, or inventions that revolutionize productivity, etc…) mathematically eliminate the possibility of exogenous growth, arguing for a different growth motive, a point conceded by many neoclassical theorists (Romer, 1996).

Critics of exogenous growth theories contend that this camp forces illogical conclusions that neglect variation among countries in technical accumulation, and neglect the effects of human capital generally, and knowledge capital, specifically. In doing so, this camp disregards vast literature on the effects of such variables as technology diffusion and adoption (Easterly & Levine, 2001; Klingner & Sabet, 2005; Romer, 1990; Taylor, 1911a), educational attainment and quality (UNESCO, 2010d; 2001b; Barro & Lee, 1996), knowledge spillovers (Arrow, 1962), governance (IMF, 2011d; Abed & Gupta, 2002b; Kaufmann et al., 2008), and corruption

(deLeon, 1993; Rose-Ackerman, 1978; Tanzi, 1998). Therefore, a Keynesian-based theory is insufficient for this thesis.

Endogenous Growth Theory

Endogenous Growth Theory refutes Solow's work. Literature from the endogenous growth camp treats factors such as governance, policy, effects of the national economic and financial systems, education and innovation, social capital, and incentives as agents that develop human and social capital and drive incremental growth from within. These work in conjunction with technical progress and innovation (Barro et al., 1994; Barro & Sala-i-Martin, 2004; Putnam, 2000; Romer, 1994b). While exogenous growth models require holding technical advancement constant across countries, endogenous models treat technical change as a variable (Easterly & Levine, 2001; Romer, 2001). Ironically, advances in computing technology since Solow's seminal work on exogenous technical change was its undoing. The ability to manage and calculate large cross-country longitudinal data sets allowed researchers to treat more variables as variables rather than constants (Cobb & Douglas, 1928; Sala-i-Martin, 1997). When applied to evidence in westernized, democratized countries, and/or to isolated and self-reliant regions (*e.g.,* the US, UK), use of endogenous theory yield strong correlations between sound governance and growth. This becomes important when considering economic policy options in the US, and/or for non-westernized communities that rely on endogenous factors for growth (King & Levine, 1993; Martin & Sunley, 1998).

However, this theory neglects a different part of the evidence: revolutionary shifts, technology adoption rates, and other effects of external events (Easterly & Levine, 2001; Solow, 1956). Endogenous growth neglects the volume of literature on the stages of economic growth. Rostow (1991, p. 6) cites that sometimes,"[T]he stage of preconditions arise not endogenously, but by some external intrusion by more advanced societies. These invasions-literal or figurative-shocked the traditional society and began or hastened its undoing." Therefore, both endogenous

and exogenous theories are guilty of remaining true to their precepts at the expense of evidence. Endogenous Growth Theory neglects external factors such as peace treaties or a neighboring county's research on solar energy, where Exogenous Growth Theory neglects internal factors such as education spillovers or positive externalities of a hometown Olympic athlete.

New Growth Theory

New Growth Theory links the roots of endogenous economic factors to technical progress adoption and diffusion increases that drive economic growth. New Growth Theory builds a bridge between endogenous and exogenous camps. For example, assume that a new technology in an era of rapid globalization developed outside the economy in question. Each economy must choose whether to employ its own resources in order to adopt the exogenous catalyst, or not. Romer (1998a, p. 2) describes the process thus.

New Growth Theory identifies three specific features that make growth possible. First, we live in a physical world that is filled with vastly more unexplored possibilities than we can image, let alone explore. Second. Our ability to cooperate and trade with large numbers people makes it possible for millions of discoveries and small bits of knowledge to be shared. Third, and most important, markets create incentive for people to exert effort, make discoveries, and share information.

Specifically, Romer's concept of knowledge as an economic asset (non-rivalrous, partially excludable, human capital with increasing returns) is fundamental to potential growth. "If a poor nation invests in education and does not destroy the incentives for its citizens to acquire ideas from the rest of the world," Romer states, "it can rapidly take advantage of the publicly available part of the worldwide stock of knowledge" (2007, p. 3). Romer asserts that living standards are a direct result of knowledge and technology adoption (Romer, 1993). Phelps (2008, p. 14) attributes a *good* economy to education, which produces vitality, and policies that promote inclusion.

New Growth Theory proponents defend good governance as a practical necessity for education and the educated to flourish, drawing from classical economic theorists and new ideas from the governance literature (Phelps, 2008). North (1992, p. 3) suggests economists treat the policy development and implementation as a function of governance, "…as a critical factor in the performance of economies, as the source of the diverse performance of economies, and as the explanation for inefficient markets." The assertion that Social Capital is a pre-condition to a long-wave growth stage from the political economy literature, parallels New Growth Theory, entrepreneurial theories, and theories on human capital (Matheson, 2008; Nelson & Phelps, 1966; Phelps, 2008; Putnam, 2000; Rostow, 1991; Schumpeter, 1939; H. A. Simon, 1986; Xu & Li, 2008).

Technology and innovation diffusion and adoption are both precursors and by-products of the quality and quantity of education, GDP, economic growth and economic development by country; the speed and degree of its transfer are, in part, a result of the governance system, and the success of its development policy implementation, specifically, of education policy (Nelson & Phelps, 1966; North, 1992; Romer, 1993). "Innovation diffusion and adoption describes the spread of new products, values, policies, or processes beyond the locus of their original success. If viewed purposively, this spread can be described as both organizational learning and knowledge management" (Sabet & Klingner, 1993). This concept of adoption closely resembles Taylor's principles of scientific knowledge, scientific learning, and scientific management (1911a). Klingner & Sabet (2005) summarize the importance: "the true measure of these innovations' value lies in the effectiveness of shared information and transferred knowledge to attain societal goals like sustainable development" (p. 206).

Critics argue that education does not produce increasing returns. Instead, education is like other economic factors experiencing constant returns to the investment in education (Solow, 1957), diminishing marginal utility and rent seeking (North, 1990), crowding out by other activities such as leisure, and quality or effectiveness challenges (Pritchett, 2001, p. 369). Rather than

knowledge spillovers and positive externalities from education, put forth by New Growth Theory, recent studies provide evidence of negative education externalities and "lack of a correlation between growth and education expansion…and schooling variables" (p. 380). Importantly, Pritchett (p. 382) asserts, "[r]ent seeking and directly unproductive activities can be privately remunerative but socially dysfunctional and reduce overall growth" which agrees with North (1990) suggesting that informal institutions may benefit from education. One key challenge to this argument is consistency in definitions. Returns to education (its funding cost/benefit balance) and returns to knowledge are different.

For the evidences of and requirements for economic growth, this thesis builds on Romer (1996), and Easterly & Levine (2001), by modeling dimensions of governance, development policy, education, and market demand of output. New Growth Theory stands apart from other economic growth theories for three reasons: it shoulders change regardless of origin, pace, or variety, it allows researchers to treat factors of growth as variables or constants, and it incorporates education as a variable in economic growth.

Convergence, Divergence, and Bridging Theories

Incomes convergence over time

Robert Barro starts with Solow's neoclassical growth model for evidence of "automatic forces that lead to convergence over time in the levels of per capita income and product" (1991, p. 1). The homogeneity of US data earned credit for much of the statistical strength in his model. This point is significant (and expanded later) as an indicator of internal, freer market forces tending to cause converging incomes (Barro, 2000). Convergence Theory maintains credibility for use in discrete situations, but until recently, had done little to inform economic globalization (Barro, 2000, 2001a; Olson, Sarna et al., 2000; Jeffrey D. Sachs, 2005; Sadik, 2008). Convergence Theory may explain why incomes in Kuznets' maturing economies grew increasingly similar. Clearly, according to Sachs & Warner (1995), it is the "policy choices" that underlie

each country's economic realities and have allowed countries into the "'convergence club'" or kept it trapped in poverty shy the human capital to raise it up (p. 4).

Incomes divergence over time

Divergence Theory suggests that incomes diverge over time in certain situations. It gained widespread recognition as the refutation to the convergence literature (Easterly & Levine, 2001; Matheson, 2008). Substantial scholarly work and research on discrete datasets agree that there are likely correlations between economic growth and divergent incomes (Baddeley, 2006; Pritchett, 1997), including Rothschild's "recalculation of Kuznets' intersectoral inequality ratio for the private nonagricultural economy between 1948 and 1982 [which] results in a significant increase in sectoral inequality" (1986, p. 205). Stated otherwise, incomes between the richest and poorest in this particular data set grew apart. Divergence Theory may explain why incomes in Kuznets' immature economies grew increasingly disparate. Pritchett (1997, p. 15) suggests that the divergence is a matter of progressiveness or "backwardness" of the "fabric of civic society." He follows with a prescription for growth policy similar to Sachs & Warner (1995a, p. 10), that countries must provide an open economy, free of repressive regulations, with relatively low levels of corruption .

Bridging Theories

Finally, five theories offer a bridge between the convergence and divergence camps. Knowledge about the difference between camps is the critical issue for many policy analysts and public administrators and policy makers, as the outcome bears great weight on long-term individual and aggregate prosperity (North, 1991b). First, poverty trap theories suggest simultaneous convergence and divergence. For instance, if policy makers neglect to appropriate adequate funding for education, empirical evidence shows that the poorest sector of the population will grow relatively poorer while the richest grow relatively richer (Romer & Barro, 1990).

Second, Schumpeterian Growth Theory asserts that growth comes from quality-improving research and development innovations. This theory informs the balance of economic growth theories and adds validity to both camps, as each require innovation regardless of its origin (Howitt, 1999; Howitt & Mayer-Foulkes, 2005; Phelps, 2008).

Third, in *The Stages of Economic Growth*, Rostow (1991) offers an historical view of characteristics of economies in different stages, which, in turn, offers potential bridges between the four major economic growth camps, allowing each to be right under certain conditions. Fortunately, this suggests a futility in damning converging or diverging theories, as these mean little without knowledge of the relative stage and trend of the economy, and less without an accounting of the variable's composition. It is insufficient to ask a question requesting results on income trajectories absent considerable context.

Path dependency theories suggest that the economy's behavior may take time to adjust, as investment in land, labor, and capital, are somewhat directional (North, 1991b). The movement of individual income inequality may be the result of a combination of factors from legacy economic investments, which take time to adjust, and legacy skill sets, which take time to re-train.

Lastly, Kuznets' data support both diverging and converging income inequality. He aptly applied different data scenarios to discover the determiners of inequality, while he admitted that the data available left much unknown, and part of the credit for the richness of information available now goes to him for the challenge he presented. Kuznets (1934, pp. 6-7), as the innovator of National Income accounting, knew and reported the limitations of GDP per capita as a measurement for individual welfare or "the reverse side of income".

In summary, the convergence / divergence argument remains a vital and productive field that tells policy makers and analysts nothing, or, worse, can be skewed to tell them anything, absent considerable context. For this reason, and because the presence of corruption skews the very data policy makers need to make development decisions (Schneider et al., 2010), it is critical to

inform public administrators and their policy development endeavors that good governance and control over corruption is important (Tanzi, 1998). Public budgets (*e.g.,* infrastructure, health care, public works, and courts) suffer, in the presence of corruption. This thesis defends that siphoning funds away from education does more harm than siphoning funds from other publically funded programs as reduction in education budgets has an increasingly detrimental effect on economic growth when the others' effects are, at best, constant (health care) or decreasing (depreciating assets) (Mauro, 1997). Mauro asserts "corruption lowers expenditure on education" (p. 267).

New Growth Theory is critical to developing the healthy growth policy arguments. Education funding as a part of development policy must be protected, as education, and consequently, society's ability to adopt and use technology effectively, hinges on this protection. This may explain why healthier, more mature economies with better governance and control over corruption experience less poverty, less inequality, and converging incomes; however, this is a thought for future research.

Measuring Education Delivery

Measuring the Quantity of Education (Supply)

The body of literature on assessing and measuring education is enormous. The literature surrounding education delivery includes research on quality, quantity, and process measurements. Quality measures for education include the output-based test scores and literacy rates, and on inputs such as materials, facilities, class size, and teacher training (UNESCO, 2005; D. J. Brewer, Krop et al., 1999, p. 187). Quantity measures for education include matriculation rates, years of schooling, level of school attainment, and gender parity (Barro & Lee, 1993, pp. 365-368). These factors are critical for assessing education systems, however, they measure education delivery based on an externally developed budget. This body of literature, which informs education as an industry, discipline, or process, is outside the scope of this project. Rather, the focus for this thesis is public expenditures budgeted for public education, and the effects of corruption on the public expenditures for public education. Education funding provides its own body of literature. However, this thesis focuses on empirical data indicating the level of public funding from official budgets, or "supply-side" financing (Patrinos, 2007, p. 1). Therefore literature on other funding or school choice methods, to include private schools or private funding (M. Friedman, 1997), voucher programs and school choice (M. Schneider et al., 1997; Teske & Schneider, 2001), bussing, scholarships, grants, foreign aid, for-profit schools, and "demand-side" mechanism (Patrinos, 2007, p. 3) is excused for the purposes of this thesis.

Measuring the Value of Education (demand)

Another body of literature, equally vast, measures the value of the schooling provided to the individual (*e.g.,* living standards, individual income, human development, and contribution to society) and to society (returns to education, national and international market value of goods and services). This work is quintessential to the questions in this thesis. Sen integrates these volumes of work into his work on Human Development (HDR, 2009e; Sen, 1997, 1999, 2004). He syn-

thesizes work by other Nobel Laureates into the human development literature by including edu-

cation as a means to economic development (*e.g.,* Kuznets' work on accounting for individual

income in National Income accounting [1934, 1955]; Solow's work on technical change, [1957];

Arrow's work on learning by doing, [1962]; and Simon's ideas on bounded rationality, [1997])

Sen added work by noted scholars on the subject, as well (*e.g.,* the work of Sachs &

Warner, on knowledge spillovers and economic policy, [1995]; Romer's work on education and

technical change [1990]; proceedings for the World Bank on development through education by

Romer et al. [1992]; as well as Romer's work on endogenous change, investment in education,

and New Growth Theory [1994, 1998]; and Barro's work in educational attainment and human

capital [1993, 2001, 2001b]). Together with the IGO's research network and the vast amount of

research ongoing for the Millennium Development Project, Sen created an index that asserts to

measure the extent to which each country's governance system to date has aided, or neglected,

human development; this included the educational institutions it fostered over time. The HDI

provides the pre-test data for this thesis, upon which the research questions are built.

This thesis assumes that education is a public good, which is not universally held to be

true. Education Expenditure data in this thesis does not account for private funding of private or

public education, nor does it account for foreign aid for education. School choice, voucher pro-

grams, charter schools, and lotteries were borne out of a perceived or real shortcoming of the

system in place. Education may be better, more efficiently or more effectively delivered by the

private sector (M. Friedman, 1997).

Governance Corruption in Education

Literacy rates, reporting the percentage of citizens with "basic reading, writing, and nu-

meracy skills" (UNESCO, 2010d, p. 94), are insufficient to measure the complexity of education

gained during school, and are often self-reported. The rate of graduation is equally insufficient to

measure education earned, if graduates are not proficient readers or writers. Testing high on an

exam is an insufficient measure for application of knowledge on the job, or the degree to which knowledge and training matches the needs of employers (Romer, 1998a). Other factors to include gender differences (Barro & Lee, 2001), class size (D. J. Brewer et al., 1999), school choice (M. Schneider et al., 1997), school funding and competition (M. Friedman, 1997), and overall school quality (GMR, 2005), are neglected in the EAI.

Gupta et al. (1998) report that by reducing the public resource pool, the remuneration for corruption could shift toward that which complements the endeavors of those that are corrupt and away from approved, sustainable economic development and market-demanded goods and services. Following are three such methods, or privilege-seeking behaviors. Bribes paid to school officials merely to gain entry into school (p. 10) is one method by which funds are transferred away from the public resource pool; by virtue of the official position of the bribe taker, this effectively increases the cost of education, creating a daunting financial barrier to "free" public education, and this income by-passes taxation. A second possible method is the under-delivery and over-pricing of supplies and textbooks, thereby increasing the effective cost of schooling and adversely affecting the demand (p. 11). Under-delivery decreases the quality and quantity of education, with suppliers withholding shipment until sufficient bribes are paid (p. 12). The third method, because of school officials or other government employees having access to the budget, is siphoning, using various processes to create a profit center. One such mechanism is "under-invoicing", where part of the taxes collected for public education are pocketed (p. 6); another is "corruption and theft," where the service is charged to the government and either under provided or not provided to the public at all (p. 5).

Education is measurable by its evidence, it is measured in human capital (Barro, 2001b; Lucas, 1988), and specifically, knowledge capital. Knowledge as capital, knowledge gains, positive knowledge externalities, knowledge spillovers, and other adjectives that describe that transformation from the process of educating to gain a state of knowledge, or increases in intel-

lectual muscle, show up in economic growth generally, and individual income, specifically.

Klingner & Sabet (2005) refer to knowledge, adaptation, and innovation as a "knowledge spiral"

(p. 208). Romer (1990), consistent with Solow (1956, 1957), asserts that human capital, partially

determined by knowledge, determines the rate of economic growth.

It is because of this EAI shortcoming and shortcomings of other widely used measures

for education attainment (*e.g.,* test scores, literacy rates, graduation rates) that this thesis employs

two measures for education. The first measure for education is an input-driven or supply-side

measure, government spending on public education as a percentage of total government expendi-

ture, or Education Expenditure (EE), using the precedent set by the United Nations in its report

Education for All (GMR, 2010d). Many measures for education inputs exist, however, since this

thesis uses GDP per capita as a measure for economic development, consistent with Sen (1997),

La Porta & Shleifer (2008), and Gupta et al. (1998), we must use a derivative of GDP as the

measure for a nation's spending on education to maintain data and construct validity across varia-

bles, which the ICP network provides in the public data. The second measure for education is an

outcome-driven measure, or demand-side, Income per capita (Ic), which serves as the proxy for

learning, knowledge, and skill attainment consistent with a widely accepted and standard method

since Kuznets (1934) (Barro & Lee, 1993; Galbraith & Kum, 2005; Gupta et al., 1998; Mauro,

Abed et al., 2002; Schumpeter, 1939; Sen, 1984)

Two scholars help frame debate on the effects of corruption on education. Both scholars

argue that corruption is corrosive to a society; from the quantitative, empirical analysis discipline,

Paulo Mauro, and from the qualitative, social capital discipline is Paulo Freire. Paulo Mauro

(1998) Harvard Ph.D. and Fiscal Operations Division Chief for the IMF, asserts in *Corruption*

and the Composition of Government Expenditure, "…there is significant evidence that corruption

is negatively associated with government expenditure on education, and the relationship is robust

to a number of changes in specification." He continues by arguing that the education line item

67

suffers relative to those more lucrative to rent-seekers. "The results are consistent with the hypothesis that education provides more limited opportunities for rent-seeking than other items do…" and that there "is also tentative evidence that the direction of the causal link is at least in part from corruption to the composition of spending" (Mauro et al., 2002). Scholars and economists with research confirming Mauro include Armstrong (2005) Gupta et al. (2000), Pritchett , (1997), and Chua, (2006, 1997, 2001).

The Paulo Freire Institute Headquarters is at the UCLA Graduate School for Education and Information Studies, which also houses the Freire Online, a Journal, dedicated to critical pedagogy. Freire was awarded the UNESCO Prize of Education for Peace in 1986, and the International Development Prize by King Baudouin of Belgium in 1980 for his work in education and pedagogy. He also served as the Secretary of Education in Sao Paulo, and his "work has been the subject of hundreds of Ph.D dissertations." His work informs public policy through theories of social capital, critical theory, and social networks (Gadotti & Torres, 2005). In the seminal work on pedagogy in lesser-developed regions, Freire uncovers struggles against the tides of political, corrupt, philosophical, cultural, and social oppression infused into the educational systems in communist counties. He asserts that the ineffectual education inhibits personal freedoms and the ability for the undereducated to be the 'owner of one's own labor' (1970, p. 183). More critical is his assertion about motive. "The oppressor knows full well that this intervention [educating the oppressed] would not be to his interest. What is to his interest is for the people to continue in a state of submersion, impotent in the face of oppressive reality" (Freire, 1970, p. 52). Furthermore, "I have already affirmed that it would indeed be naive to expect the oppressor elites to carry out a liberating education" (p. 135).

Contrary to Mauro and Freire assertions about education under communist regimes, the evidence reveals robust education policy and delivery plans from the 1920s and through the 1980s intended to create sustainable economic growth in the former USSR. The *Technical and*

Vocational Education in the Union of Soviet Socialist Republics (Movsovic, 1959) written for

UNESCO, reports the education plan than ensures free education, "the forms and methods of

which are identical for the whole Soviet Union" (p. 14). Where the "role of the instructor… in

the educational process is to inculcate into his pupils sound professional knowledge and work

habits and develop creative initiatives and conscious labour discipline in them" (p. 19). The duty

of the teaching staff is "…constantly to improve professional and pedagogical qualifications and

to….make careful preparation for classes…" (p. 19). The report continues, "…it is the function

of every department in an institution of higher education not only to acquaint the student with the

scientific bases of present-day industry but also to provide him with the solid scientific-

theoretical grounding necessary for his future activity" (p. 44).

> Article 121: Constitution of the USSR establishes the right to education of the citizens of the Soviet Union. This right is given effect through the system of general and compulsory education,… general secondary education,…institutions of higher education and secondary vocational schools, and…frees technical education and training….With all school education in the pupil's mother tongue (p. 4).

Researchers such as Pritchett (2001), Levy (2007), and North (1991), attempt to reconcile

the incongruous evidence. Between the USSR's the "enormous sums spent by the Soviet State on

higher education and secondary vocational training" (p. 6) and research and development cele-

brated as the hallmark in education planning for sustainable economic development, and its

delivery over sixty years. However, growth waned increasingly toward the end of this period

(Movsovic, 1959; Ofer, 1987). Ofer suggests that four factors contributed to the downward trend

(1987, pg. 1812-1820). First is the inability of central planning to adapt to growing complexities

in the world economy. Second is the increase in relative spending on defense versus technical in-

novation. Third is the "weakening of the material incentive system…which in turn has negative

effects on work motivation and efforts, thus further reducing growth" (p. 1815). Last is the effect

of corruption. "A 'second economy' developing alongside the main, public sector takes another

bite from the effectiveness of the public sector" (p. 1816). Schneider refers to this economy as the Shadow Economy (Schneider et al., 2010a).

Paradoxically, New Growth Theory follows both declarations in the Constitution of the USSR and the work of Mauro, Freire and others, affirming that education is a requirement of development, and deserves priority status in the public budgeting process (UNESCO, 2010d; Cortright, 2001).

According to Mauro, "education turns out to be the only component of public spending that remains significantly associated with corruption when the level of per capita income in 1980 is used as an additional explanatory variable" (2000, p. 10). However, underdeveloped countries have literate citizens. In fact, one of the reasons that the Educational Attainment Index (EAI) is problematic for the HDI is due to the lack of a better measure of education quality and quantity. Nearly every country has literacy rates near 99% (HDR, 2007, p. 226) corrupt or not, developed or not, with centrally planned or market-based economies. This fact alone calls for a different metric for gauging education broadly and literacy specifically. This fact also begs a different measure for the value of education as decided by the market for the sum of what a country's education public has thought of, innovated, created, engineered, developed, advanced, manufactured, and most importantly to the level of Gross Domestic Product per capita, what they have sold.

Summary

Research Question 1 asks whether the change in Human Development Index accounts for the change in Income per capita. Hypothesis 1 maintains that the change in the HDI does not account for the change in Ic. Affirming this hypothesis opens the door to test whether the HDI together with a variable for the Shadow Economy better explains the change in Ic. Research Question 2 represents an attempt to inform the body of literature of the effect of corruption in these areas, specifically. Hypothesis 2 maintains that governance corruption, as measured by the SE, has a negative effect on Ic. Research Question 3 asks whether governance corruption, as measured by the Shadow Economy has a negative effect on Education Expenditures. Hypothesis 3 maintains that the variation in EE can be explained by the variation in SE. If the tests affirm this hypothesis, the door is open to test the last research question. Research Question 4: Do the pre-test Human Development Index, governance corruption, and education expenditure together explain the change in Income per Capita? Hypothesis 4 maintains that there is a significant relationship between the change in Ic, HDI_{1990} and change in EE.

CHAPTER 3

THE DATA AND METHODOLOGY

Methodology

New Growth Theory suggests that both endogenous and exogenous factors encourage

economic change, and that knowledge gains that support and invite research, development, tech-

nology advances, and the skills to implement technology adoption are pivotal to creating healthy,

sustainable economic development. The research design for this thesis is quasi-experimental.

Equations 1, 2, and 3 are foundational to Equation 4. Equation 1 tests the correlation coefficient,

or the strength of association (Gujarati & Porter, 2009, p. 20). Equation 2 compares adjusted R^2

between two linear regression equations. For Equation 3, the model is a linear regression, and the

method is OLS. The key equation for this thesis is Equation 4, which compare the change in To-

tal Income per Capita, Ic_T, to the change in education expenditures (EE) given the HDI_{1990}

starting point. The model specified for this research is a Three-Variable Linear Regression using

Ordinary Least Squares method. The model uses Ic_T as the regressand, which depends on

HDI_{1990}, and EE as regressors ($Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i}\, \mu_i$). The test for this model using the

Linear Regression Analysis is a hypothesis test to predict the ΔIc_3 per county. The equation run

to predict ΔIc_3 follows ($\Delta IcT = Intercept + HDI_{1990} + \Delta EE3 + error$). The approach to test

the hypotheses is the test-of-significance approach. For test purposes, STATA requires the re-

searcher to set the level of significance. The level of significance is set at the 95% confidence

level, or 5% probability level of rejecting a hypothesis that is true. However, each test will identi-

fy the p-value, or "the lowest significance level at which a null hypothesis can be rejected"

(Gujarati & Porter, 2009, p. 122).

Hypothesis

The key hypothesis this thesis tests is: governance corruption's effects on education through the public resource mechanism (Government Expenditure on Public Education as a percentage of Total Government Expenditures) are direct and negative; the higher the degree of corruption, the lower the relative education budget per capita. Further, the lower the education budget per capita, the lower the relative individual income.

Data

The raw data are non-experimental, pooled, qualitative and quantitative, on a sample of 30 countries occupying the Central and Eastern Europe, out of a current potential population of between 189 and 194 sovereign countries in the world plus 10 to 13 additional countries in transitional phases (depending on the changing political climate). All of the countries in the world are the population set. The transitional country pertinent to this study is Kosovo, which is reported as part of Serbia, as the declaration for separation of these two countries occurred after the 2008 post-test year (See Country Briefs). To test the effects of governance corruption on education budgets and income per capita, we chose Central and Eastern European countries that offer unique data availability due to the focus by research scholars from international data agencies on the unprecedented events of the late 1980s marked by the dissolution of the Soviet Union. The data used herein have been quantified through indexing or econometric modeling, by the data purveyor, and were collected and input by hand, imported, or copied in a quantitative format. Each country has pre-test (1990) and post-test (2008) variables that are a nominal-scale, are discrete, and random. The data are linear (in the parameters, or *i.e.,* not exponential) (Gujarati & Porter, 2009, p. 38).

The data are secondary data, retrieved from three sources that are each contributors to established International Comparisons Program (ICP) (2011e) network of shared data. The first and

major source is human development data from the Human Development Project, part of the United Nations Development Programme (UNDP). This program's research produces data, data sets, fact sheets, reports, and policy recommendations on human development, international and national-level governance and public administration research. This research work supports the UNDP state and local governance programs, and other UN programs. The project attempts to gather data on every country, with success in procuring data for 166 countries. The data are collected through a combination of surveys, institutional data, government data, primary research on location, and sharing with ICP. The resulting qualitative and quantitative data are indexed from 1 to 100 (HDR, 2008c). The HDI is a composite index composed of three indices; the Educational Attainment Index (EAI); the Life Expectancy Index (LEI); and the Gross Domestic Product Index (GDPI). When GDP is divided by population, the resulting figure is Income per Capita, or Individual Income Ic. In other words, the HDI = (1 x LEI) + (1 x EAI) + (1 x Ic). Each component index is developed from its component data. The composite HDI and these component indices are the key variables used. The source for each data point used is noted on Table D, found in the Appendix.

The second source for data is the Shadow Economy (Schneider et al., 2010b) data, which provides figures measuring that GDP produced and not counted in National Income Accounting. The sources for data on 162 countries included a combination of surveys, institutional data, government data, primary research, and data shared through the. This data set covers all of the sample set of countries, missing only three data points, Turkey and Mongolia in 1990, and Turkmenistan in 2007. These three countries were studied individually, and the data for these is available using the same methods (Eilat & Zinnes, 2000; Yereli et al., 2007; Zhou, 2007). The method preferred by Schneider is the MIMIC method (Dell'Anno & Schneider, 2006), which is a simultaneous equation model sets qualitative and quantitative data into an equation as inputs and

outputs productivity to derive the percentage of the official economy lost to unofficial productivity.

Comparisons of nine common methods for calculating national-level governance corruption (e.g. WGI, TI, CPI, GCB, BPI) are found in Table A (Schneider & Enste, 2000). Many other methods exist for sub-national, firm level (*e.g.,* BEEPS, EBRD), and other forms of corruption. Dell'Anno & Schnieder state, "[t]here does not exist any commonly accepted methodology for estimating the underground economy. The estimates are always subjective and depend on the quality of the dataset the methods applied and the subjective decisions of the researcher. Shadow Economy estimates are never very stable and absolute…" (2006, p. 16). The authors go on to support the MIMIC method by asserting that the MIMIC is the better of the known methods for calculating national-level governance corruption relative to productivity on the books (F. G. Schneider & Enste, 2000) (see Figure 1. MIMIC Model below).
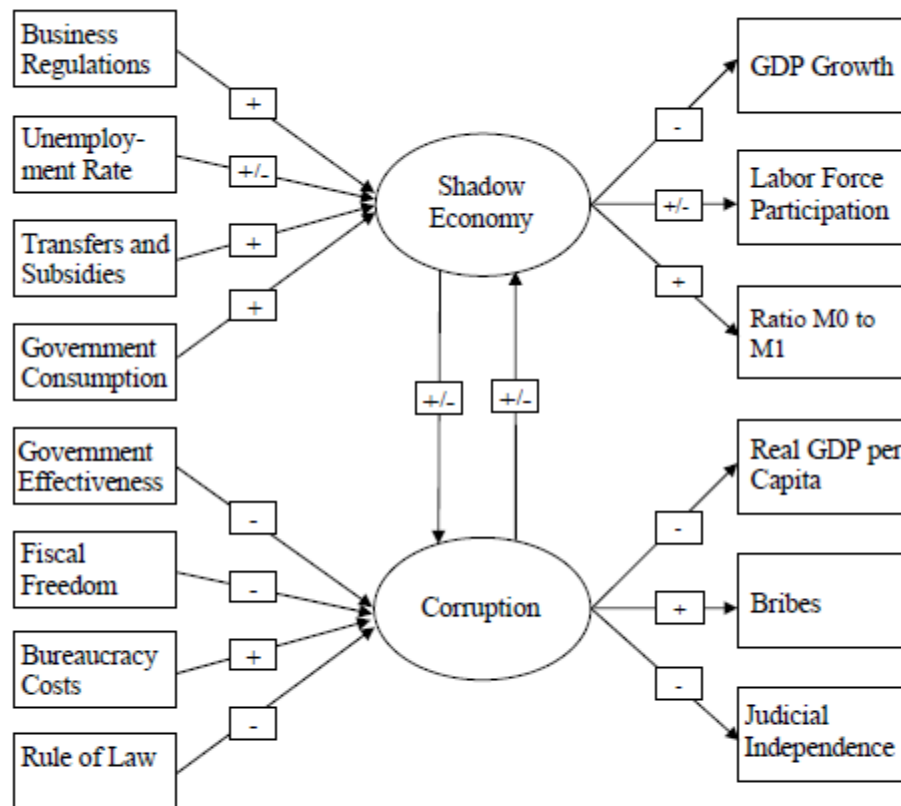
Figure 5 Shadow Economy MIMIC Model.

For the purposes of this thesis, in order "[t]o get information about the dynamics and size of the Shadow Economy, the MIMIC model is still one of the best approaches to this purpose" (p. 16). Since Schneider's data have the best coverage on the sample set of counties and since it utilized the most appropriate measurement method for our purpose (which is the Shadow Economy size), Schneider's data is the better choice overall.

The third source of data is the Estates project, for the Education Expenditure data. Estates is a joint international research group for the UN, through UNESCO, the World Bank Research Group, and the ICP. Yearly data publications such as the Global Education Digest (GED) provide a catalog of statistics. Data for the 2008 Education Expenditures are found in the 2008 GED, Table 13, Public Expenditure and Expenditure on Education by Nature of Spending (pp. 167-176). The statistic used in this thesis is the Public Education Expenditure (EE) as a Percentage of Total Government Expenditure. In a major advancement, the UN, through its Statistical Information System on Expenditure in Education (SISEE), requested yearly data procurement as of 1998. From 1970 to 1990, United Nations Children's Fund (UNICEF) gathered the official data every five years, and added data to the set in the off years when it met all of the previous methodology criteria. Researchers and the ICP still use the earlier data and deem it as reliable (UNECSO, 1998). Data for education statistics deemed reliable based on the new methodology became available in 1998. Important here is the dearth of data that exist from 1986 through 1998; only 54 data points exist for these eight years for the entire world, and only seven of these are readings for the sample set.

Reliability and Validity Testing

See Data Reliability and Validity Testing in the Appendix.

Research Question 1

Recall that which Kuznets, Sen, and others assert is Official GDP per capita, Ic, may not be a sufficient proxy for individual human development, as it lacks variables such as individual welfare, living standard, or earning capability (HDR, 2008c, p. 225; Kuznets, 1934; Sen, 1984). Klenow & Rodriguez-Clare (2005, p. 833) and others assert the evidence from many scholars employing various models are consistent in that less than half of the variation in individual income can be attributed change in human capital and development (Easterly & Levine, 2001; Klenow & Rodríguez-Clare, 1997; W. K. Wong, 2007a). In addition, the HDI is a widely accepted proxy for the stock of human capital (HDR, 1990; Sen, 1997; W.-K. Wong, 2007b)

Research Question 1.1: Are the HDI and the change in the Total Income per Capita correlated at .5 or higher? To test this construct with our data, we can run the correlation coefficient test. If we reject the null hypothesis, then we can conclude for now, that the correlation between the Human Development Index from 1990 to 2008 and the change in Total Income per Capita, (Ic_T), is less than .5, consistent with the rule used in Wong, (2007b).

Hypothesis 1.1: The correlation coefficient of ΔIc_T from 1990 to 2008 and ΔHDI from 1990 to 2008 is less than .5.

Hypothesis 1.2: The correlation coefficient of ΔIc_T from 1990 to 2008 and ΔHDI component indices, $\Delta LEI + EAI$ from 1990 to 2008 is less than .33.

This test of the changes in the independent component indices is important for several reasons. Sen contends that the sum total of the factors human development over time are captured in a snap shot in time measured by the HDI composite index made up of three component indices, EAI, LEI, and GDPI. Using the HDI, then, we respect and factor into the equation the sum of history for each country, or the proxy human capital and development stock at one point

77

in time, consistent with the recent literature (Klenow & Rodriquez-Clare, 2005; Wong, 2007). Examining the change equalizes the pre-test differences in countries.

Gujarati & Porter, (2009) explain that a properly specified model will yield an intercept term. The intercept may be statistically equal to zero, which means that it runs through the origin, or close to it; however, the near-zero intercept is a product of the regression equation. In the case of 30 Eastern and Central European countries, the regression equation will yield an intercept term. This point on the Y-axis is the starting point for calculating the effects of governance corruption on education budgets and income per country. Without "very strong a priori expectation," according to Gujarati & Porter (2009), "one would be well advised to stick to the conventional, intercept-present model" (p. 150). One example of a strong a priori expectation of a zero-intercept model exists here. In equation 4, one would expect that where human development is zero, income would also be zero, justifying a zero-intercept model (Gujarati & Porter, 2009, p. 150). In addition, one can check for misspecification of a model after the fact by checking the statistical significance of the constant, to verify that there are no omitted variables (p. 198). For example, the greatest difference in the pre-test HDI, or HDI_{1990}, in the Central and Eastern Europe is .263 points, from Tajikistan at .636 to Austria at .899. The post-test HDI, or HDI_{2007}, for these two countries is .688 and .955 respectively, or .267 points apart. Tajikistan's HDI increased .0818 points, while that of Austria increased .0623. Examining the change in HDI shows that the sum total of the change in economic and demographic data underlying Tajikistan's HDI increased at a faster pace than did Austria, .015% faster.

According to Gujarati & Porter, (2009), analyzing the change in our variables minimizes the chances of heteroscedasticity, autocorrelation, and multicolinearity naturally present in pooled (cross-country, time-series) data. Heteroscedasticity is the unequal variances due to errors, outliers, inertia, skewness, or incorrectly specified linear regression (pp. 365-368). Autocorrelation is "correlation between members of a series of observations ordered in time or space…and does not

exist in the u_i" (p. 413). Multicolinearity is "similar linear relationships among some or all explanatory variables" (p. 321) naturally present in pooled data. Gujarati Porter, (2009, p. 434) suggests the Durban Watson *d-test* cannot be used to detect serial correlation, in the equations containing SE or EE data, as data points are missing from both sets of data. It cannot be used on the HDI data or the SE data, as the data have lagged variables.

This examination may inform many policy questions. Two sample policy questions specific to this thesis are: "Which element of the development data had the greatest impact on Tajikistan's change in income per capita?" alternatively, "What component measure of Moldova's HDI shows the least progress over time, and what can a policy change do to fix it?"

The thesis' purpose is to measure the effects of corruption on education budgets and income per capita as measured by the capability of an individual to earn income. This brings us to the second research question.

Research Question 2

Does the corruption, as measured by the Shadow Economy, negatively affect Income per Capita? This question requires us to add the first new data point, corruption as measured by the SE. Recall that the SE is stated as a percentage of the official GDP (Schneider et al., 2010b). The SE set of data is one of several that assert to measure the size of GDP lost to corruption, hidden in the underground or unofficial markets. The only such study with adequate coverage of Central and Eastern Europe was sponsored by the World Bank and published in 2010, Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2008.

We employ an OLS regression to test our second research question. We will regress the ΔIc_O and the HDI_{1990}, and then add a variable for explanatory power. If the theoretical construct is valid, the relationship between ΔIc_O and HDI_{1990} will be statistically significant; and the SE variable will add explanatory power to the regression making it a more robust predictor of ΔIc_O. Consistent with widely accepted growth regression models, maintaining a constant in a compari-

son of equations measuring goodness of fit (adjusted R^2) expresses that the pretest starting point was not zero; this shows the value of the pretest stock of Human Development based on the OLS regressions (Barro, 2001b; Cobb & Douglas, 1928; Klenow & Rodriquez-Clare, 2005; Mauro, Abed et al., 2002; Pritchett, 2001).

Hypothesis 2: The adjusted R^2 resulting from an OLS regression of pretest HDI against the ΔIc_O is equal to or greater than the adjusted R^2 resulting from an OLS regression of pretest HDI and SE_{2008} against the ΔIc_O.

If we reject the null hypothesis, we must conclude for now that the SE_{2008} per country included in the regression with the HDI_{1990}, explains more of the variation in the ΔIc_3 than does the HDI_{1990} alone. This finding would be consistent with the theory that corruption hinders economic development, and of the findings of Schneider et al. (2010), Kauffmann et al. (2008), Johnston, (2007), and other scholars.

Research Question 3

Does a change in the Shadow Economy negatively affect Education Expenditure? To test the effects of corruption on education budgets, we employ our final new variable, Education Expenditure (EE). If the presence of the SE has no significant effect on the EE, then we find that the theoretical construct was invalid. The null hypothesis states that ΔEEc does not equal the ΔSE. Gupta et al. (1998, p. 28), and others assert the evidence from many scholars employing various models are consistent in that less than one third of the variation in individual income can be attributed directly to the change in corruption (Kaufmann, 2003; Pritchett, 2001). In addition, the HDI is a widely accepted proxy for the stock of human capital (HDR, 1990; Sen, 1997; Wong, 2007)

Hypothesis 3: The variation in the ΔEEc from 1990 to 2008 is not explained by the variation in SE2008.

If we reject the null hypothesis, that the effects of the SE on EE are statistically significant, then we can conclude for now that a relationship exists. If our working theory about corruption's effects on education budgets prevails, and an increase in the size of the SE results in a decrease in education funding, we can measure this decrease, and measure its effect, if any, on income.

Research Question 4.1

Do the pre-test HDI, governance corruption, and education expenditure together explain the change in Income per capita? The null hypothesis asserts that there is no significant relationship between the Official Income per Capita, ΔIc_O, and the explanatory variables, HDI_{1990}, and the change in EE per capita from the pretest to the posttest values, EEc_{1990} and EEc_{2008}.

Hypothesis 4.1: The variation in the ΔIc_O from 1990 to 2008 is explained by the variation in the HDI_{1990}, and the change from EEc_3 in $_{1990}$ and EEc_3 in $_{2008}$.

If we reject the null hypothesis, we can assume for now that a relationship between the pre and post-test per capita figures for EE_3, and the ΔIc_O exists.

Research Question 4.2

The null hypothesis asserts that there is no significant relationship between the Unofficial Income per Capita, ΔIc_U, and the explanatory variables, HDI_{1990}, change from the EE per capita pretest the and posttest values, ΔEEc

Hypothesis 4.2: The variation in the $\Delta Ic3$ from 1990 to 2007 is explained by the variation in the HDI1990, and the change in EEc3 from 1990 to 2008.

Research Question 4.3

The null hypothesis asserts that there is no significant relationship between the ΔIc_U and the explanatory variables, HDI_{1990}, the change ΔEE_3

Hypothesis 4.3: The variation in the ΔIc_T from 1990 to 2008 is not explained by the variation in the HDI_{1990}, and the change in EEc from 1990 to 2008.

Summary Statistics

```
    Variable |    Ob       Mean   Std. Dev.        Min         Max
-------------+-------------------------------------------------------
     HDI1990 |    30        .78   .0575506        .636        .896
       HDICh |    30  .0507633   .0283926      -.0204       .0918
     LEI_EAI |    30  130.0245   20.85304     103.895     183.504
      IcChDc |    30  1218.467   1702.272       -1194        6119
      SE1990 |    30     27.42   8.127662        12.2        45.1
      SE2008 |    30  38.95233   11.65943        16.1        68.8
    SE2008Dc |    30  1287.911   1022.685         109        4113
 IcTotalChDc |    30    1824.1   2225.068       -1382        7862
     EEDc2008 |    30  551.7297   554.2541    46.02128    2397.184
      EEChDc |    30   123.391   266.0138   -272.1115    890.7047
```

CHAPTER 4

ANALYSIS

Research Question 1

Research Question 1.1: Are the Human Development Index and the Change in the Income per capita correlated at .5 or higher? To test this construct with our data, we can run the correlation coefficient test. If we reject the null hypothesis, then we can conclude for now that the correlation between the Human Development Index from 1990 to 2008 and the change in Income per Capita is less than .5, consistent with the rule used in Wong, (2007b).

Summary Statistics

```
    Variable |        Obs        Mean    Std. Dev.        Min         Max
-------------+----------------------------------------------------------
       HDICh |         30    .0507633    .0283926     -.0204       .0918
     LEI_EAI |         30    130.0245    20.85304    103.895     183.504
      IcChDc |         30    1218.467    1702.272      -1194        6119
```

Correlation Coefficient

```
             |   IcChDc    HDICh    LEI EAI
-------------+---------------------------------
      IcChDc |   1.0000
       HDICh |   0.5005   1.0000
     LEI_EAI |   0.6793   0.2639    1.000
```

Hypothesis 1.1: The correlation coefficient of ΔIc from 1990 to 2008 and ΔHDI from 1990 to 2008 is less than .5.

Equation 1.1

Null Hypothesis: H_O : $if\ |t|\ \geq t_{\frac{\alpha}{2},n-2} : reject\ H_O$

Maintained Hypothesis: H_1 : $if\ |t|\ < t_{\frac{\alpha}{2},n-2} : fail\ to\ reject\ H_O$

The correlation coefficient is .4599, which is less than the benchmark of .5. On a one-tailed test, the t-statistic is -.501, well within the acceptance region of < .1697 at 30 degrees of freedom at the 95% confidence level. For now, we maintain that the correlation between the

change in the variables meets the test requirement, at less than the benchmark. Below, the scatter graph shows the correlation.
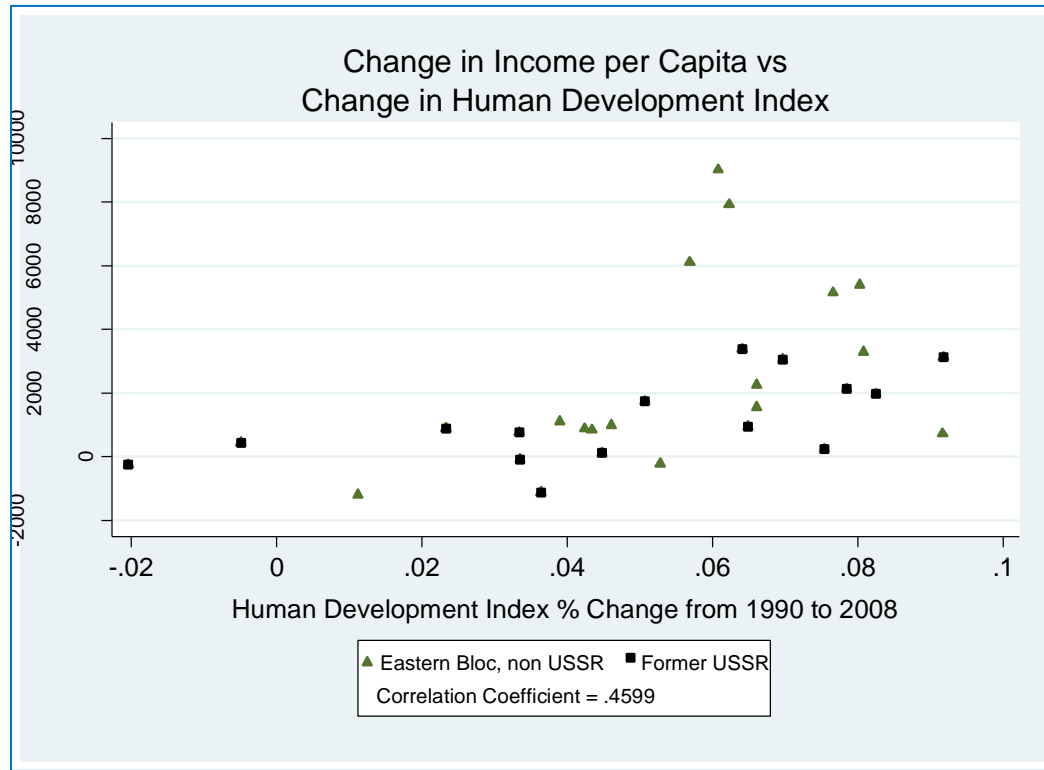
Figure 1.1 Change in Income per Capita and Change in Human Development Index.

To test the correlation between the Life Expectancy Index and the Educational Attainment Index, equally weighted (the weights in the HDI are equally weighted), we take the GDP index out, and re-run the correlation coefficient.

Hypothesis 1.2: The correlation coefficient of ΔIc from 1990 to 2008 and ΔHDI component indices, ΔLEI + EAI from 1990 to 2008 is less than .5.

Equation 1.2

Null Hypothesis: $\mathrm{H_O} :\ if\ |t|\ \geq t_{\frac{\alpha}{2},n-2} : reject\ H_O$

Maintained Hypothesis: $\mathrm{H_1} :\ if\ |t|\ < t_{\frac{\alpha}{2},n-2} : fail\ to\ reject\ H_O$

The correlation coefficient is .0552, which is significantly less than the benchmark of .5. On a one-tailed test, the t-statistic is -.501, well within the acceptance region of < .1697 at 30 degrees

84

of freedom at the 95% confidence level. For now, we maintain that the correlation between the change in the HDI is very slightly negatively correlated with the change in Ic, at -.0015. Below is the scatter graph depicting the correlation between the Change in Income per Capita and the life expectancy and educational attainment indices.
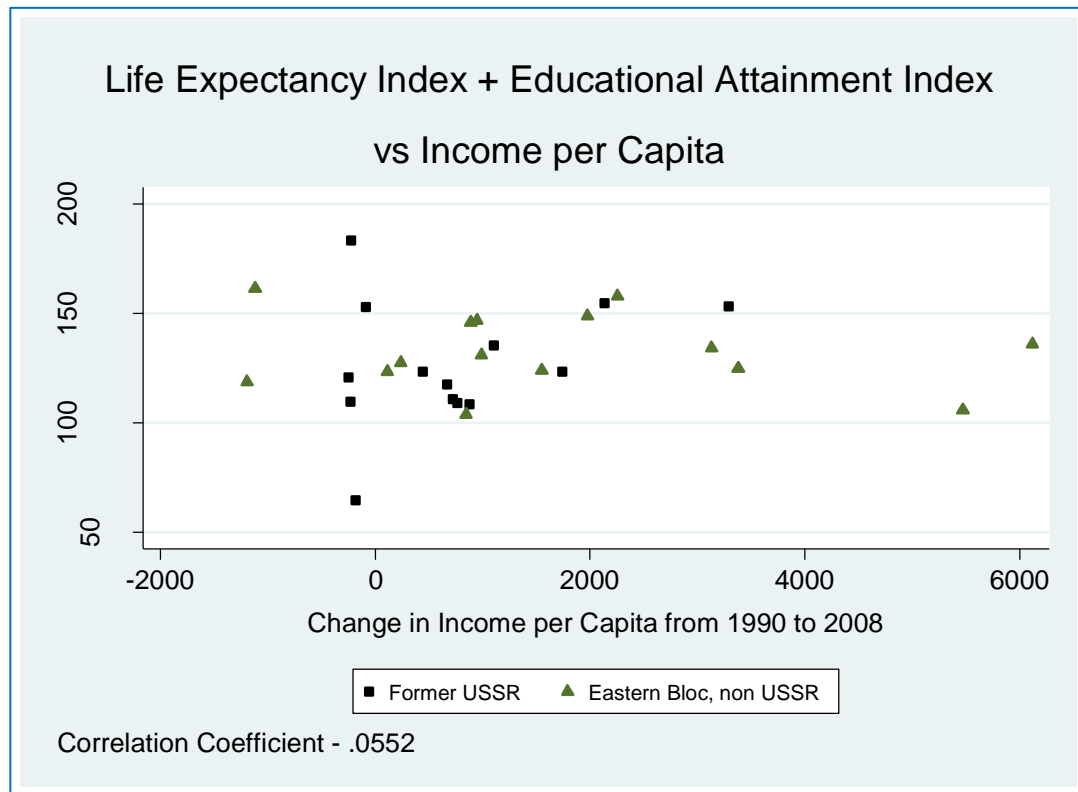
Figure 1.2 Change in Income per Capita and Change in LEI and EAI.

Research Question 2

Does governance corruption negatively affect Individual Income? (Governance corruption is measured by the average Shadow Economy from 2000-2008, and Education expenditure is measured with the proxy EEc. A linear regression comparison of the R^2 tests Research Question 2, using the Change in Income per Capita$_{Official}$, ΔIc_O, as the dependent and HDI$_{1990}$ as the independent variable. HDI$_{1990}$ is the pre-test or legacy measure, the starting point in human development measurements, for the sample set of countries.

Hypothesis 2: The adjusted R^2 resulting from a linear regression of HDI against the ΔIc_O is higher than the adjusted R^2 resulting from a linear regression of HDI and SE$_{2008}$ against the ΔIc_O.

Equation 2.1

Null Hypothesis: H$_O$: $\Delta Ic_O \neq$ HDI$_{1990}$

Maintained Hypothesis: H$_1$: $\Delta Ic_O =$ HDI$_{1990}$

Summary Statistics

```
    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+-----------------------------------------------------------
     HDI1990 |         30         .78    .0575506       .636       .896
      Ic1990 |         30    3010.067    3628.822        426      19428
      SE2008 |         30    38.95233    11.65943       16.1       68.8
```

Correlation Coefficient

```
             |  HDI1990   Ic1990   SE2008
-------------+---------------------------
     HDI1990 |   1.0000
      Ic1990 |   0.6886   1.0000
      SE2008 |  -0.5148  -0.5977   1.0000
```

Test: Linear Regression 95% Confidence Level

Regressed dependent variable ΔIc_O using independent variable HDI_{1990}

```
  Source |       SS        df       MS              Number of obs =      30
---------+------------------------------            F( 1,    28) =    20.84
   Model | 35855179.2    1  35855179.2              Prob > F      =  0.0001
Residual | 48178968.3   28  1720677.44              R-squared     =  0.4267
---------+------------------------------            Adj R-squared =  0.4062
   Total | 84034147.5   29  2897729.22              Root MSE      =  1311.7
-----------------------------------------------------------------------------
   IcChDc |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+-------------------------------------------------------------------
 HDI1990 |   19320.9    4232.54     4.56   0.000     10650.93    27990.86
   _cons | -13851.83    3310.056   -4.18   0.000    -20632.17   -7071.489
```

Post-Estimation Statistics for Regression

White's test for Ho: homoscedasticity
     against Ha: unrestricted heteroscedasticity
    chi2(2)= 8.62
   Prob > chi2=   0.0134

Cameron & Trivedi's decomposition of IM-test

```
            Source |     chi2      df       p
-------------------+----------------------------
 Heteroskedasticity |     8.62      2    0.0134
          Skewness |     4.37      1    0.0365
          Kurtosis |     0.58      1    0.4452
-------------------+----------------------------
             Total |    13.58      4    0.0088
```

Ramsey RESET test using powers of the fitted values of IcChDc
   Ho: model has no omitted variables
    F(3, 25) =   5.95
     Prob > F =   0.0033

Information Criteria

```
Model |   Obs   ll(null)   ll(model)    df         AIC         BIC
------+------------------------------------------------------------
   .  |    30  -265.2512   -256.9067     2    517.8134    520.6158
```

     The regression output shows an *F*-score at 20.84 with 29 degrees of freedom, at most,

40.62 % of the variation in the ΔIc_O can be explained by the variation in the HDI_{1990}, and the *t*-

value of the HDI relationship is very significant at 4.56. This test passes the "*2-t* Rule of

Thumb." The RMSE is 1311.7. "The minimum MSE criterion consists in choosing an estimator

whose MSE is the least in a competing set of estimators…there is a trade-off involved – to obtain

minimum variance, you may have to accept some bias" (Gujarati & Porter, 2009, p. 828).

White's test confirms autocorrelation with X^2 of 8.62 on 2 degrees of freedom. The IM-test confirms left skewed data at 4.37 and a short and fat (platykurtic) kurtosis distribution at .58. The AIC is 517.8. The analysis suggests rejecting the null hypothesis, confirming a significant relationship. Next, we compare the R^2 values between here and a second equation adding SE_{2008} as an explanatory variable.

Equation 2.2

Null Hypothesis:

$H_O : R^2$ *regress* ΔIc_O *with* $HDI_{1990} \geq R^2$ *regress* ΔIc_O *with* HDI_{1990} *and* SE_{2008}

Maintained Hypothesis:

$H_1 : R^2$ regress ΔIc_O with $HDI_{1990} < R^2$ regress ΔIc_O with HDI_{1990} and SE_{2008}

Summary Statistics

```
Variable |    Obs        Mean    Std. Dev.        Min        Max
 HDI1990 |     30         .78    .0575506       .636       .896
  SE2008 |     30    38.95233    11.65943       16.1       68.8
  IcChDc |     30    1218.467    1702.272      -1194       6119
```

Correlation Coefficient

```
         |  HDI1990   IcChDc   SE2008
---------+-------------------------------
 HDI1990 |   1.0000
  IcChDc |   0.6532   1.0000
  SE2008 |  -0.5148  -0.5981   1.0000
```

Test: Linear Regression95% Confidence Level

Regressed dependent variable ΔIc_O using independent variables HDI_{1990} and SE_{2008}.

```
      Source |       SS       df       MS              Number of obs =      30
        F(  2,    27) =    14.62
       Model |  43690767.5     2  21845383.8           Prob > F      =  0.0000
    Residual |  40343379.9    27  1494199.26           R-squared     =  0.5199
-------------+------------------------------           Adj R-squared =  0.4844
       Total |  84034147.5    29  2897729.22           Root MSE      =  1222.4
----------------------------------------------------------------------------
      IcChDc |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+--------------------------------------------------------------
     HDI1990 |  13897.18    4600.658    3.02   0.005      4457.41    23336.95
      SE2008 | -52.00247    22.70871   -2.29   0.030     -98.5969    -5.40805
       _cons | -7595.717    4120.428   -1.84   0.076    -16050.14    858.7039
```

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
 against Ha:unrestricted heteroscedasticity
        chi2(5)=6.43
Prob > chi2=0.2670

Cameron & Trivedi's decomposition of IM-test

```
             Source |      chi2     df       p
--------------------+----------------------------
  Heteroskedasticity |      6.43      5    0.2670
            Skewness |      2.08      2    0.3536
            Kurtosis |      2.56      1    0.1097
--------------------+----------------------------
               Total |     11.06      8    0.1981
```

```
Ramsey RESET test using powers of the fitted values of IcChDc
       Ho:  model has no omitted variables
                 F(3, 24) =      3.44
                 Prob > F =     0.0328
```

Akaike's Information Criteria Score of the Model

```
Model |    Obs    ll(null)    ll(model)      df          AIC         BIC
------+-----------------------------------------------------------------
    . |     30   -265.2512    -254.2443       3     514.4885    518.6921
------------------------------------------------------------------------
```

The regression output shows a lower, yet still significant, *F*-score at 14.62 with 29 degrees of freedom. At most, 48.44% of the variation in the ΔIc_O can be explained by the variation in the pre-test HDI, and both *t*-values of the HDI_{1990} and SE_{2008} variables are high and significant at 3.026 and -2.29. This test passes the "2-*t* Rule of Thumb". The RMSE is lower at 1222.4. White's test rejects autocorrelation with X^2 of 6.43 on 5 degrees of freedom. The IM-test confirms a left skewed data at 2.08 and less platykurtic at 2.56. The AIC is lower, at 514.4885, which is preferred to the higher in Equation 2.1 of AIC 517.8134. Akaike's Information Criteria (AIC) states that when "comparing two or more models, the model with the lowest value of AIC is preferred" (p. 494). The analysis suggests rejecting the null hypothesis, confirming a significant relationship on the second equation.

A comparison of the R^2 test suggests rejecting the null hypothesis, and confirming for now that the R^2 of the augmented, second equation is higher, from 40.62% to 48.44%. In addition, the entire equation is more robust with a lower RMSE, lower AIC, less skewness, and no

89

autocorrelation. The *F*-score, which is lower yet still high, explains that the shape of the distribution is flatter. The rejected hypothesis suggests a temporary conclusion in favor of the SE_{2008} per country included in the regression with the HDI_{1990}, explains more of the variation in ΔIc_O than does the HDI_{1990} alone. This finding would be consistent with the theory that corruption hinders economic development, and of the findings of Schneider et al. (2010), Kauffmann et al. (2008), Johnston, (2007), Mauro (1998b) and other scholars.

Research Question 3

Does governance corruption negatively affect future Education Expenditure? (Governance corruption is measured by the average Shadow Economy from 1990-1999, and Education Expenditure is the average from 2000-2008,(EE\$c$_{2008}$)). A linear regression tests the effects of corruption on EE\$c$_{2008}$, by setting the EE\$c$_{2008}$ as the dependent variable and the Shadow Economy in 1990, SE$_{1990}$, as the dependent variable.

Hypothesis 3: The variation in the EE\$c$_{2008}$ is not explained by the variation in SE$_{1990}$.

Equation 3

Null Hypothesis: H$_O$: EE\$c$_{2008}$≠ SE$_{1990}$

Maintained Hypothesis: H$_1$: EE\$c$_{2008}$= SE$_{1990}$

Test: Linear Regression 95% Confidence Level

Summary Statistics

```
    Variable |        Obs        Mean    Std. Dev.         Min         Max
-------------+--------------------------------------------------------------
      SE1990 |         30       27.42    8.127662        12.2        45.1
      SE2008 |         30    38.95233    11.65943        16.1        68.8
     EEDc2008 |        30    551.7297    554.2541    46.02128    2397.184
```

Correlation Coefficient

```
             |   SE1990    SE2008 EEDc2008
-------------+--------------------------------
      SE1990 |   1.0000
      SE2008 |   0.8359    1.0000
     EEDc2008 |  -0.4450   -0.5807    1.0000
```

Regressed dependent variable EEc$_{1990}$ using independent variable SE$_{1990}$.

```
      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  1,    28) =    6.91
       Model |  1764361.29     1  1764361.29           Prob > F      =  0.0137
    Residual |  7144369.59    28  255156.057           R-squared     =  0.1980
-------------+------------------------------           Adj R-squared =  0.1694
       Total |  8908730.88    29  307197.616           Root MSE      =  505.13


-----------------------------------------------------------------------------
    EE$c2008 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
      SE1990 |  -30.34793   11.54086    -2.63   0.014    -53.98832   -6.707546
       _cons |    1383.87   329.6151     4.20   0.000     708.6841    2059.056
```

Does governance corruption negatively affect current Education Expenditure? (Governance corruption is measured by the average Shadow Economy from 2000-2008, and Education Expenditure is the average from 2000-2008,(EE\$c$_{2008}$)). A linear regression tests the effects of corruption on EE\$c$_{2008}$, by setting the EE\$c$_{2008}$ as the dependent variable and the SE$_{2008}$ as the dependent variable.

Hypothesis 3: The variation in the EE\$c$_{2008}$is not explained by the variation in SE$_{2008}$.

Equation 3

Null Hypothesis: H$_O$: EE\$c$_{2008}$≠ SE$_{2008}$

Maintained Hypothesis: H$_1$: EE\$c$_{2008}$= SE$_{2008}$

Test: Linear Regression 95% Confidence Level

Regressed dependent variable EEc$_{1990}$ using independent variable SE$_{2008}$.

```
  Source |       SS        df        MS              Number of obs =        30
---------+-----------------------------              F(  1,    28) =    14.24
   Model | 3003721.27     1   3003721.27             Prob > F      =   0.0008
Residual | 5905009.61    28     210893.2             R-squared     =   0.3372
---------+-----------------------------              Adj R-squared =   0.3135
   Total | 8908730.88    29   307197.616             Root MSE      =   459.23


------------------------------------------------------------------------------
 EEDc2008 |     Coef.   Std. Err.       t    P>|t|     [95% Conf. Interval]
----------+-------------------------------------------------------------------
   SE2008 | -27.60283   7.314002    -3.77    0.001    -42.58489   -12.62078
    _cons |  1626.924   296.9787     5.48    0.000     1018.591    2235.258
```

The test results suggest rejecting the null hypothesis and concluding for now that the effects of the Shadow Economy on the Education Expenditures per person stated in dollars, SE$_{2008}$ on EE\$c$_{2008}$ are statistically significant. In addition, 31.35% of the variation in Education Expenditures can be explained by variation in the Shadow Economy. The *F*-score is 14.24 with 29 degrees of freedom and the t-value is -3.77 for SE$_{2008}$. The RMSE is low, at 459.23. This test passes the "*2-t* Rule of Thumb." Figure 3.1 shows the effects of the Shadow Economy on future Education Expenditures. Figure 3.2 shows the effects of the Shadow Economy on current Education Expenditures.
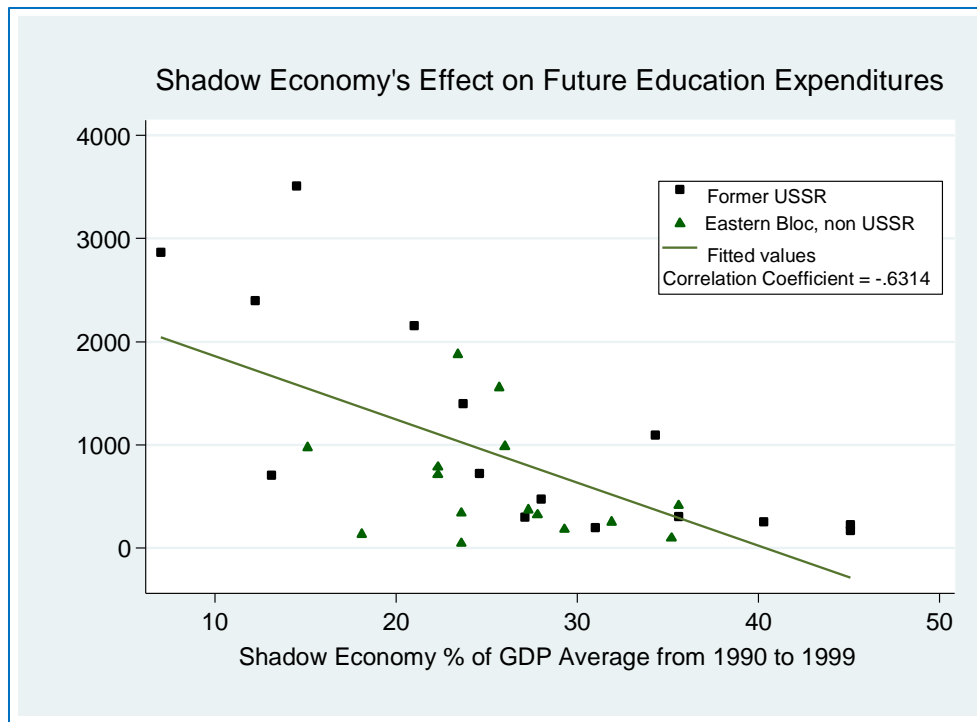
Figure 3.1 Shadow Economy's Effects on Future Education Expenditures.
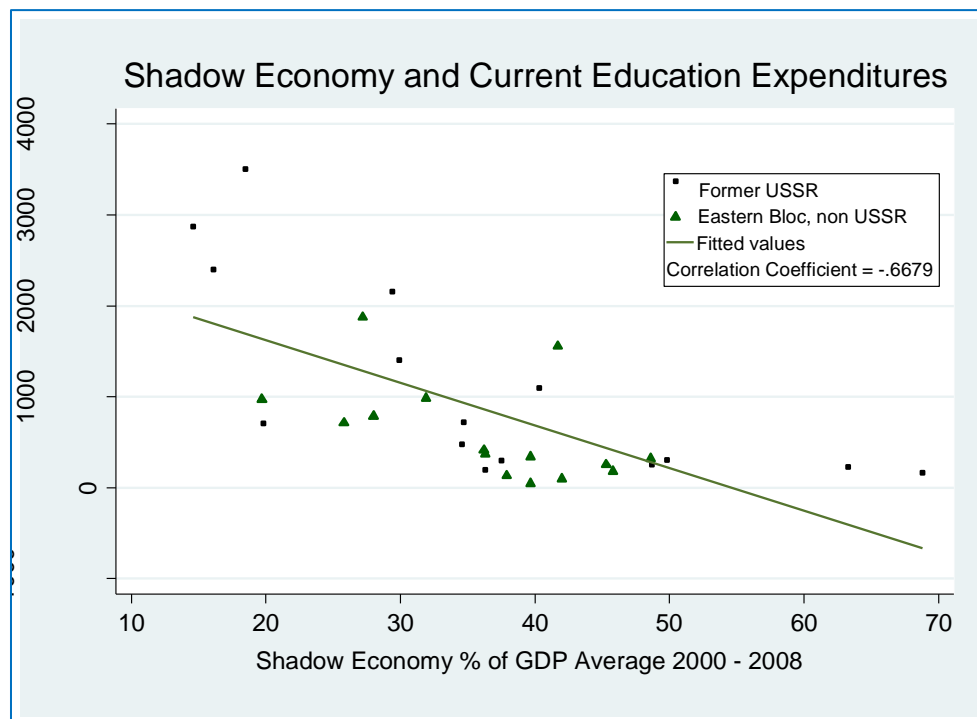
Figure 3.2 Shadow Economy's Effects on Current Education Expenditures.

Research Question 4

Do the pre-test HDI, governance corruption, and education expenditure explain the change in Income per Capita? The question is tested in three ways. (4.1) do these variables explain Official Income per Capita? (4.2) Do the pre-test HDI, governance corruption, and education expenditure explain the change in Unofficial Income per Capita? (4.3) Do the pre-test HDI, governance corruption, and education expenditure explain the change in Total Income per Capita? (Corruption is measured by the average Shadow Economy as a percent of official GDP from 2000-2008, and education expenditure is measured with the proxy ΔEEc).

Hypothesis 4.1

The null hypothesis asserts that there is no relationship between the change in Official Income per Capita, ΔIc_O, and two explanatory variables, (1) the change in Education Expenditure Dollars per Capita between the EEc pretest and the posttest values, EEc_{1990} and EEc_{2008}. Gujarati and Porter (2009) explain and supports the practice of adding variables to seek higher degrees of significance and better over-all fit (pp. 474-475).

> *Hypothesis 4.1: The variation in the ΔIc_O from 1990 to 2008 is not explained by the variation in the HDI_{1990} the ΔEEc from 1990 to 2008.*

Equation 4.1

> *Null Hypothesis*: H_O : $\Delta Ic_O \neq HDI_{1990} + \Delta EEc_{1990-2008}$

> *Maintained Hypothesis*: H_1 : $\Delta Ic_O = HDI_{1990} + \Delta EEc_{1990-2008}$

Summary Statistics

```
    Variable |        Mean     Std. Dev.        Min         Max
-------------+-------------------------------------------------
     ΔIc_O|    1218.467     1702.272        -1194        6119
    HDI_1990|         .78     .0575506         .636        .896
     ΔEEc |     123.391     266.0138     -272.112     890.705
```

Correlation Coefficients

```
             |  HDI1990    EEChDc    IcChDc
-------------+---------------------------------
    HDI1990  |   1.0000
     EEChDc  |   0.4165    1.0000
     IcChDc  |   0.6532    0.4723    1.0000
```

Test: Linear Regression 95% Confidence Level

Regress dependent ΔIc_O with independent variables HDI_{1990}, $EE\Delta\$/c_{1990\text{-}2008}$.

```
    Source |      SS         df      MS                Number of obs =      30
-----------+------------------------------            F( 2,    28) =   14.83
     Model | 66140725.8      2   33070362.9           Prob > F      = 0.0000
  Residual | 62433252.2     28   2229759.01           R-squared     = 0.5144
-----------+------------------------------            Adj R-squared = 0.4797
     Total |  128573978     30   4285799.27           Root MSE      = 1493.2


-------------------------------------------------------------------------------
     ΔIcO  |    Coef.    Std. Err.      t     P>|t|    [95% Conf. Interval]
-----------+-------------------------------------------------------------------
   HDI1990 | 1182.643    390.9868     3.02    0.005    381.7431    1983.543
    EEChDc | 2.821598    1.057342     2.67    0.013    .6557301    4.987465
```

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
against Ha: unrestricted heteroscedasticity
chi2(5)   =   14.36
Prob > chi2 =   0.0135

Cameron & Trivedi's decomposition of IM-test

```
             Source |     chi2     df       p
--------------------+---------------------------
 Heteroskedasticity |    14.36      5    0.0135
           Skewness |     3.12      2    0.2099
           Kurtosis |     0.34      1    0.5590
--------------------+---------------------------
              Total |    17.83      8    0.0226
```

Akaike's Information Criteria Score of the Model

```
Model |   Obs    ll(null)    ll(model)     df        AIC         BIC
------+--------------------------------------------------------------
  . |    30        .       -260.7943       2     525.5886     528.391
```

The regression output shows an *F*-score of 14.83 with 30 degrees of freedom. At most,

47.97% of the variation in the dollar change in total income per capita can be explained by the

variation in the independent variables. The *t*-values are significant. This test passes the "*2-t* Rule

of Thumb" as both the HDI and Education Expenditure *t*-scores are greater than 2.0 (Gujarati &

Porter, 2009). The RMSE is 1493.2. The White's General Test for Heteroscedasticity reports a critical X^2 value of 14.36 which exceeds the X^2 score of 5 degrees of freedom, and which means heteroscedasticity exists (p. 387). The IM-test confirms slightly left skewed data at 3.12, and a slightly platykurtic at .34. The AIC is 525.5886. The analysis of the equation suggests rejecting the null hypothesis, confirming for now that a statistically significant relationship exists.

The results of this test suggest that the change in Official Income per Person over the 18-year test period is a function of the human development starting point in 1990 (HDI_{1990}), and the change in percentage of the total expenditure budget set aside per person for public education in the pretest and posttest years (EEc_{1990} and EEc_{2008}). However interesting these results, the change in Official Income per Capita, Ic_O, does not account for the change in Unofficial, or Shadow Economy Income per Capita, which may yield more informative results, (Gujarati & Porter, 2009). (See Table: 4.1 in the Appendix).

Testing this equation using the change in the official dollars earned, however, will tend to provide a skew in the results that captures bigness in the available official income, and not the distribution of that income to the individual, only the average distribution of official income per capita. This can be seen in Table 4, on the graphic comparison of these equations. (See Table: 4.1 in the Appendix).

Hypothesis 4.2

The null hypothesis asserts that there is no relationship between the change in Unofficial Income per Capita, ΔIc_U, and two explanatory variables, (1) the change in Education Expenditure Dollars per Capita between the EEc pretest and the posttest values, EEc_{1990} and EEc_{2008}. Gujarati and Porter (2009) explain and supports the practice of adding variables to seek higher degrees of significance and better over-all fit (pp. 474-475).

Hypothesis 4.2: The variation in the ΔIc_U from 1990 to 2008 is not explained by the variation in the HDI_{1990} the ΔEEc from 1990 to 2008.

Equation 4.1

Null Hypothesis: $H_O : \Delta Ic_U \neq HDI_{1990} + \Delta EEc_{1990\text{-}2008}$

Maintained Hypothesis: $H1 : \Delta Ic_U = HDI_{1990} + \Delta EEc_{1990\text{-}2008}$

Summary Statistics

```
     Variable|      Mean     Std. Dev.       Min       Max
 ------------+------------------------------------------------
       IcChDc|   1218.467     1702.272       -1194      6119
     HDI1990 |       .78      .0575506        .636      .896
       EEChDc|    123.391     266.0138     -272.112   890.705
```

Correlation Coefficients

```
            |  HDI1990    EEChDc    IcChDc
------------+---------------------------------
   HDI1990  |   1.0000
    EEChDc  |   0.4165    1.0000
    IcChDc  |   0.6532    0.4723    1.0000
```

Test: Linear Regression 95% Confidence Level

Regressed dependent variable ΔIc_U using independent variables HDI_{1990}, and ΔEEc

```
    Source |      SS        df       MS               Number of obs =      30
-----------+------------------------------            F( 2,    28) =   42.64
     Model | 60294328.5      2   30147164.3           Prob > F      =  0.0000
  Residual | 19797817.4     28   707064.907           R-squared     =  0.7528
-----------+------------------------------            Adj R-squared =  0.7352
     Total | 80092145.9     30   2669738.2            Root MSE      =  840.87
------------------------------------------------------------------------------
     ΔIcU|    Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------+------------------------------------------------------------------
   HDI1990|  1411.18   220.1724     6.41   0.000     960.1775    1862.183
      ΔEEc|  1.801061  .5954103     3.02   0.005     .5814186    3.020704
------------------------------------------------------------------------------
```

Post-Estimation Statistics for Regression

White's test for Ho: homoscedasticity
        against Ha: unrestricted heteroscedasticity
    chi2(5) =   13.69
 Prob > chi2 =   0.0177

Cameron & Trivedi's decomposition of IM-test

```
            Source |     chi2     df      p
-------------------+----------------------------
Heteroskedasticity |    13.69      5    0.0177
          Skewness |    13.34      2    0.0013
          Kurtosis |     0.12      1    0.7240
             Total |    27.16      8    0.0007
```

Akaike's Information Criteria Score of the Model

```
Model |    Obs    ll(null)   ll(model)     df          AIC          BIC
------+------------------------------------------------------------------
   .  |     30           .   -243.5664      2     491.1329     493.9353
```

The regression output shows an F-score of 42.64 with 30 degrees of freedom; at most,

73.52% of the variation in the dollar change in total income per capita can be explained by the

variation in the independent variables. The t-values are all significant. This test passes the "*2-t*

Rule of Thumb*" as both the HDI and education expenditure t-scores are greater than 2.0 (Gujarati

& Porter, 2009). The RMSE is 840.87. The White's General Test for Heteroscedasticity reports

a critical X^2 value of 13.69 which exceeds the X^2 score of 5 degrees of freedom, and which means

heteroscedasticity exists (p. 387). The IM-test confirms left skewed data at 13.34, and a slightly

platykurtic at .12. The AIC is 491.1329. The analysis of the equation suggests rejecting the null

hypothesis, confirming for now that a statistically significant relationship exists.

As anticipated, this equation yielded a higher degree of "goodness of fit" (p. 386) be-

tween the variation in the change in income and the variation in the independent variables.

Testing this equation using the change in the percent of income from the unofficial economy,

however, will tend to provide a skew in the results that fails to capture magnitude of change that

is cancelled out due large swings in the opposing variable, and not necessarily a better picture of

the goodness of fit. Table 4 shows a graphic comparison of these equations. (See Appendix: Ta-

ble: 4.2)

Hypothesis 4.3

The null hypothesis asserts that there is no relationship between the change in Total In-

come per Capita, ΔIc_T, and two explanatory variables, (1) the change in Education Expenditure

Dollars per Capita between the EEc pretest and the posttest values, EEc_{1990} and EEc_{2008}. Gujarati

and Porter (2009) explain and support the practice of adding variables to seek higher degrees of

significance and better over-all fit (pp. 474-475). This equation is a summation of the coeffi-

cients from the Official Income per Capita and the Unofficial Income per Capita equations.

Hypothesis 4.3: The variation in the ΔIc_T from 1990 to 2008 is not explained by the variation in the HDI_{1990} the ΔEEc from 1990 to 2008.

Equation 4.1

Null Hypothesis: H_O : $\Delta Ic_T \neq HDI_{1990} + \Delta EEc_{1990\text{-}2008}$

Maintained Hypothesis: H1 : $\Delta Ic_T = HDI_{1990} + \Delta EEc_{1990\text{-}2008}$

Summary Statistics

```
      Variable |        Mean     Std. Dev.        Min         Max
   ------------+-------------------------------------------------
   IcTotalChDc |      1824.1      2225.068       -1382        7862
       HDI1990 |         .78      .0575506        .636        .896
        EEChDc |     123.391      266.0138    -272.112     890.705
```

Correlation Coefficient

```
              |  HDI1990 IcTota~c   EEChDc
 -------------+---------------------------
      HDI1990 |   1.0000
  IcTotalChDc |   0.6673    1.0000
       EEChDc |   0.4165    0.4811    1.0000
```

Test: Linear Regression 95% Confidence Level

Regressed dependent variable ΔIc_T using independent variables HDI_{1990}, and ΔEEc

```
Source|        SS        df        MS                Number of obs =       30
-------------+---------------------------             F( 2,     28) =   18.63
Model | 138981667       2  69490833.5          Prob > F     =   0.0000
Residual| 104415522     28  3729125.79           R-squared    =   0.5710
-------------+---------------------------          Adj R-squared =   0.5404
Total | 243397189      30  8113239.63          Root MSE     =   1931.1
```

ΔIc_T	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
HDI1990	1836.063	505.6345	3.63	0.001	800.3174	2871.808
ΔEEc	3.734703	1.367383	2.73	0.011	.9337462	6.535661

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
    against Ha: unrestricted heteroscedasticity
   chi2(5)   =   11.18
 Prob > chi2 =   0.0479

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	11.18	5	0.0479
Skewness	3.15	2	0.2069
Kurtosis	0.15	1	0.6965
Total	14.48	8	0.0700

99

Akaike's Information Criteria Score of the Model

```
Model |    Obs    ll(null)   ll(model)     df          AIC          BIC
------+-------------------------------------------------------------
    . |     30           .   -268.5085      2     541.0171     543.8195
```

The regression output shows an *F*-score of 18.63 with 30 degrees of freedom; at most,

54.04% of the variation in the dollar change in total income per capita can be explained by the

variation in the independent variables. The *t*-values are significant. This test passes the "*2-t* Rule

of Thumb" as both the HDI and Education Expenditure *t*-scores are greater than 2.0 (Gujarati &

Porter, 2009). The RMSE is 1931.1. The White's General Test for Heteroscedasticity reports a

critical X^2 value of 11.18 which exceeds the X^2 score of 5 degrees of freedom, and which means

heteroscedasticity exists (p. 387). The IM-test confirms left skewed data at 3.15/2, and a

platykurtic at .15/1. The AIC is 541.171. The analysis of the equation suggests rejecting the null

hypothesis, confirming for now that a statistically significant relationship exists.

Testing this equation using the change in the total dollars earned, however, will tend to

provide a skew in the results that captures bigness in the available income, and not necessarily a

better picture of the equality of its distribution. Table 4.3 shows a graphic comparison of these

equations. (See Appendix: Table: 4.3)

CHAPTER 5

FINDINGS

This chapter reports the findings of the data analysis and provides a summary of key points. Conclusions relative to the research questions follow, and last is a description of some data limitations. First, before we review the findings, recall that the object of this thesis is to isolate the effect that governance corruption has on the public education budget, as found on the National Income Accounting reports as the line item, *Education Expenditures as a Percentage of Total Government Expenditures* (EE). The measure chosen for corruption in governance is that used by the International Monetary Fund (Russell, 2010), in what has been referred to as the Shadow Economy. All of the results were tested at the 95% confidence level, unless stated otherwise, and the results reported below were statistically significant.

The purpose for Research Question 1 is to set the following foundation. The first step required for testing the thesis' sample set of countries against what Kuznets (1934), Sen (1984) and others predicted: data using Gross Domestic Product per Capita (Income per Capita, or Ic) do not reveal in them the work, education, and training going into the earning of the income, neither does it reflect well a measure for a standard of living.

Working from Research Question 1, the results of Equation 1.1 show a correlation of .4599 between the Human Development Index and the change in individual income in the country set occupying Central and Eastern Europe.

The .4599 correlation coefficient is less than .5, the widely accepted benchmark in research that measures effects of corruption on income (Wong, (2007). This result is consistent with expectations, and prompts one to look within the Human Development Index (HDI) to isolate possible relationships among and between the components of the HDI, the Educational Attainment Index (EAI), and the Life Expectancy Index (LEI). Notice that this equation purpose-

fully leaves out the GDP Index (GDPI), to isolate the correlation between just the life expectancy and education variables. The correlation coefficient for Equation 1.2 between the change in total income and the change in the HDI index components LEI and EAI is very low .0015. These results are consistent with Kuznets' (1934, pp. 6-7) work on factors unaccounted for in National Income Accounting, Sen's *Living Standard* (1984), and Sen and Huq's development of the Human Development Programme (1990). This second result again prompts a search for another explanation for the change in income.

The next step was to regress the HDI in 1990 (HDI_{1990}) against the change in Ic, to set up the proposed theory that the human development earned or attained in a country at the start of the test period has significant bearing on individual income. In fact, the linear regression for Equation 2.1 showed 40.62% of the variation in change in individual income (ΔIc_O) was explained by the variation in the pretest, HDI_{1990}, by country. In other words, nearly 60% of the change in earning power of the individual, as reported in the official GDP reports, was due to some factor other than the country's stock of development in 1990.

At this point, the Shadow Economy, or the corruption variable, was added to the equation. Given that, 40.62% of the variation in the ΔIc_O could be attributed to variation in HDI_{1990}, could we isolate any variation past 40.62% and attribute to corruption? By comparing the R^2 values of linear regression 2.1 to the R^2 value of a linear regression that regressed the ΔIc_3 against two factors: the HDI_{1990} and the Shadow Economy in 2008, linear regression 2.2. Linear regression 2.2 showed that 48.44% of the variation in the ΔIc_O could be attributed to the variation in both the HDI_{1990} and the Shadow Economy in 2008.

A comparison of the R^2 shows that adding the corruption variable to the human development variable per country provides a more robust explanation for the ΔIc_O per country than does the HDI_{1990} alone - from 40.62% to 48.44%. In addition, the data is less skewed. The *F*-score in the second equation is lower, yet still very high, which explains that the shape of the distribution

is flatter. The increased goodness of fit between individual income and human development

alone to human development with the shadow economy suggests that underground activity affects

the country's ability to govern in the best interest of the whole. These findings are consistent

with works by F. G. Schneider & Enste (2000) on shadow economies, Sen (1997) on human ca-

pability, and Simon, (1997) on bounded rationality, among others.

Research Question 3, using Equation 3, adds the variable for Education Expenditure, test-

ing along with the Shadow Economy, SE. A linear regression regressed EE against the Shadow

Economy in 2008. The result showed that 19.94% of the variation in change in Education Ex-

penditure was explained by the variation in the Shadow Economy as a % of GDP in 2008

(SE_{2008}). The high t-score of -2.63 and 98.6% level of confidence suggests that there is a strong

negative relationship between the level of Shadow Economy in the country and the amount of the

actual Education Expenditure as a percentage of the total GDP, per capita. This result points to

the possibility that the Shadow Economy's negative effect may operate, at least in part, through

the education function in a country, consistent with Mauro (1998), Tanzi (1998), Pritchett (2001)

and others.

Since the corruption variable seems to have affected both the change in Education Ex-

penditure and in individual income in this analysis, it would further the work on New Growth

Theory to show evidence that a test of the hypotheses in this thesis affirmed its aim. The idea is

to isolate the change in individual income from 1990 to 2008 due to the Shadow Economy and its

ability to siphon assets from public funds, and in particular, the funds going into the budget for

publicly funded education. This point, the motive may need further review. Recall the following.

Freire wrote, "…it would indeed be naive to expect the oppressor elites to carry out a lib-

erating education" (1970, p. 135). UNESCO reports that, "between 10 and 87 percent of non-

wage spending on primary education is lost" to "resource leakages" in the execution of the budget

(Hallak &Poisson, 2007, p. 105). Mauro asserts, "education turns out to be the only component

of public spending that remains significantly associated with corruption when the level of per capita income in 1980 is used as an additional explanatory [control] variable" (1997, p. 10).

Second, the playing field of education funding is rife with opportunity, in some ways greater opportunity than the budgets for other public goods, according to Mauro et al., 2002. Rent seeking and state capture by the Shadow Economy are particularly harmful to the allocation of education funds (S. Gupta et al., 2000; Mauro et al., 2002). Under-invoicing, collecting tax for an un-provided scholastic good service, adding user fees, siphoning funds for text-books or materials, and vendor kick-backs are just a few cited examples of the strategies played to abscond with public funds dedicated for education (Chua, 2006; S. Gupta et al., 2000, pp. 6-9).

Third, education may enjoy increasing returns (society gets back more than the dollars it put in). Stated otherwise, the funds invested on education, efficiently and effectively, show signs of positive externalities (*e.g.,* knowledge spillovers, technology diffusion and adoption, learning organizations, specialization and division of labor, and learning by doing). Figure 5.1 below shows the relationship between the Education Expenditure as a percentage of total government expenditure from 1990 to 2008, on average per citizen, and the Change in Total Income per Capita, on average from 1990 to 2007. The two are correlated at .9013, where the greater the education expenditures the greater the positive change in total income, on average. These results are consistent with other studies on cross-country economic growth and determinants of economic development (Barro, 2001b; Barro & Lee, 2001; Romer, 1986; UNECSO, 1998).
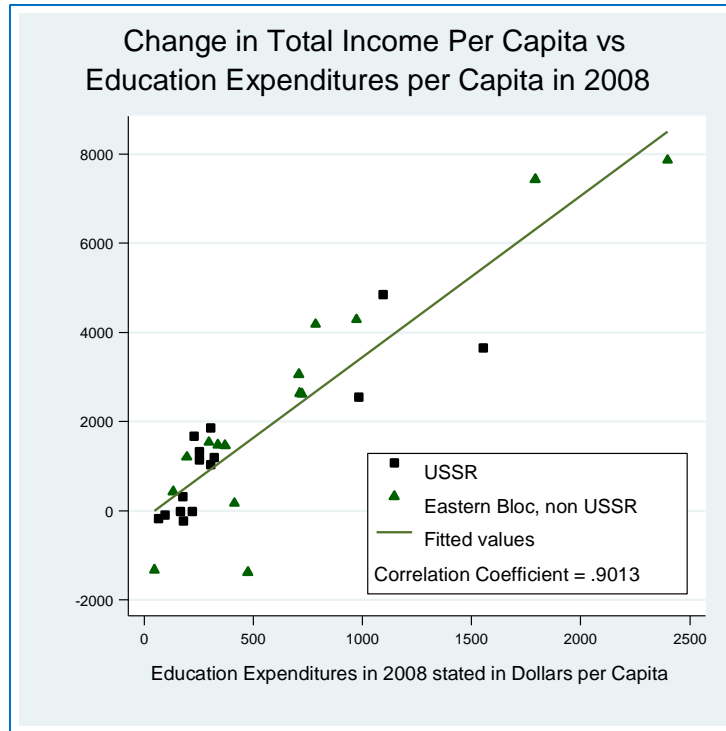
Figure 5.1 Change in Income per Capita and the Education Expenditure.
Based on the percentage of total government expenditure from 2000 to 2008
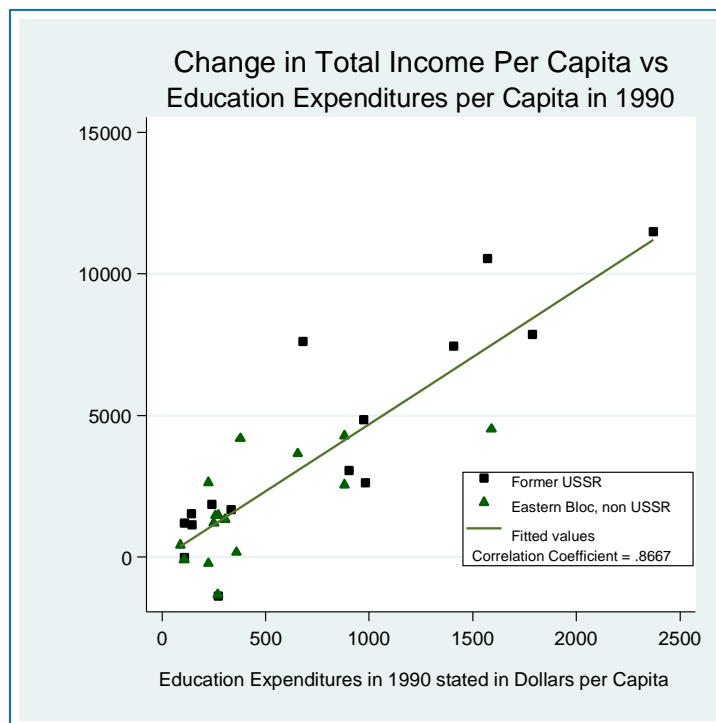
Figure 5.2 Change in Income per Capita and Lagged Education Expenditure.
Based on the percentage of total government expenditure from 1990 to 1999

In the final stage of the analysis, we test aspects of New Growth Theory, starting with ΔIc_O (Official GDP/Capita, or Ic) on the left side of the equation. Then, using the HDI_{1990} as the pretest variable on the right side of the equation, we added to it change in Education Expenditure (EE); ceteris paribus, the analysis tested three different applications of change in the EE variable. The first application was in equation 4.1, where the change in Official Income per Capita, (Ic_O) is the dependent variable. The second application was in equation 4.2, where the dependent variable was the Unofficial Income per Capita (Ic_U). The third application was in equation 4.3, which the dependent variable was Total Income per Capita, (Ic_T). The reader will find a complete review of the results on the equation comparison chart on the Table 4.0 in the Appendix.

Hypothesis 4 tests the effects of governance corruption on education budgets and income for the countries in Central and Eastern Europe. The prior analyses show that where corruption is a higher, two findings are clear. First from Hypothesis 2, as more of a country's transactions are unofficial, *On the Ground,* rather than official, *On the Books*, the lower the change in income per person since the fall of the Berlin Wall (the HDI_{1990} variable equalizes the starting position of each country). Second, as more of the productivity moves through unofficial than official channels, less is budgeted for education as a percentage of government spending (Hypothesis 3). This finding is consistent with by Mauro (1998), Tanzi (1998), Pritchett (2001) and others. Last, Hypothesis 4 combines the effects of corruption and education spending on individual income.

The correlation coefficient between the change in Official Income per Capita and the HDI in 1990 is 0.7260, with the change in education expenditure is 0.7763, and with the Shadow Economy is 0.8882. The correlation coefficient between the change in Unofficial Income per Capita and the HDI in 1990 is 0.7994, with the change in education expenditure is 0.7129. The correlation coefficient between the change in Total Income per Capita and the HDI in 1990 is 0.7359, with the change in education expenditure is 0.7875, and the Shadow Economy is already accounted for in the total income.

```
  Variable|   IcO IcU IcT  HDI1990    EEΔ$c
------------+-------------------------------------------
      IcO |   1.0000
      IcU |   0.8882   1.0000
      IcT |   0.9971   0.9070   1.0000
  HDI1990 |   0.7260   0.7994   0.7359   1.0000
   EEΔ$c |   0.7763   0.7129   0.7875   0.5704   1.0000
```

The linear regression results find a clear relationship between (the independent variables) higher rates of corruption and lower percentages on education spending, and (dependent variable) lower rate of change in the growth of income per capita from 1990 to 2008.

Hypothesis / Equation	Observations	Confidence level	Adjusted R2	F-Score	Total Degrees of Freedom	2-t Rule of Thumb	Significant Coefficients	Sign correct?	RMSE	White's Heteroscedasticity Score	Skewness	Kurtosis	Akaike's Information Criteria Score of the Model	Cameron & Trivedi's decomposition of IM-test	Better Model for prediction	Better overall model
Data Analysis																
4.1 IcO≠ HDI1990 + EEc1990- 2008	30	95%	0.4797	18.88	30	Y	Y	Y	1493.2	14.36/5	3.12/2	.34/1	525.5	17.83/8	2.229	
4.2 IcU≠ HDI1990 + EEc 1990- 2008	30	95%	0.7352	42.64	30	Y	Y	Y	840.87	13.69/5	13.34/2	.12/1	491.1	27.16/8	3.395	X
4.3 IcT≠ HDI1990 + EEc 1990- 2008	30	95%	0.5404	18.63	30	Y	Y	Y	1931	11.18/5	10.37/3	.96/1	646.4	14.48/8	1.535	

Table 4.0 Equation 4 Comparison.

Comparing the test results for Research Question 4 by equation highlights several important statistics relative to the Economic Horsepower of an economy. Consistent with Maruo (1997, 1998, 2000), the public expenditure on public education suffers in the presents of corruption. Consistent with findings in several major articles on economic growth (S. Gupta et al., 1998; Romer, 1994b, 1996, 1998a; Solow, 1956), education funding predicts the variation in current income (31.35 %) with 99% level of confidence. Past education funding predicted 16.64% of current individual income (lagging the 1990-1998 education funding average off of the 2008 income). The combined weight of corruption in the governance function on tax revenues, generally, and specifically on the education budget suppresses growth in aggregate and individual income. Worse, however, is the long run effect of this corruption on human development, income, and social capital over time. Since knowledge externalities have a unique ability to

flourish and produce a compounding effect on economic growth (Cortright, 2001a), suppressing funds to the education plant is specifically harmful to technology and innovation diffusion and adoption (Klingner & Sabet, 2005).

This evidence is generalizable to the population of countries, and provides policy makers data on the effects of governance corruption on individual income, not available heretofore. The analysis shows a highly significant relationship between increased corruption and decreased income, even after accounting for the income earned, and not counted in the National Income Accounting books – earned *On the ground*. In order for development policy makers to create sustainable economic growth, corruption at all levels of state, non-state, and private sectors must be minimized. Minimizing corruption in government and political corruption, what Moody-Stuart calls Grand Corruption (Moody-Stuart, 1996), or what Lowi calls "Big C" corruption (deLeon, 1993), may help but only to the extent that it is not somehow networked with petty, "Little c" or private sector corruption. For the purposes of this thesis, it is more important to categorize the corruption by its effect on social capital, on tax revenue, human development, education funding, or other items that may be more or less measureable.

Summary

This thesis addresses economic development policy so as to encourage healthy economic growth (Kuznets, 1966, p. 493) without the friction of institutional corruption; to inform development policy toward a more balanced growth, by offering policy makers a unique method of measuring governance corruption's effects on education budgets and individual income. New Growth Theory is the foundation for this work. Maddison (2009) provided evidence that economies, for over two thousand years, have grown. Maddison's data show that since 1820, the average yearly world GDP growth is 2.21 percent (2009, p. 4). Further, he showed that the pace of growth increased approximately at the time of the industrial revolutions in Europe and North America. The IMF is projecting a 4% global growth for 2011 and 2012, with advanced economies growing 1.5% to 2% (UPI, 2011, p. 1). Other evidence a shows "that poverty and inequality are on the rise" (Lozada, 2002, p. 5), leaving some to believe that a direct and positive correlation between growth and increased poverty and inequality exists. It does not necessarily follow, however, that the growth is responsible for increasing poverty or widening the gap of inequality (Gujarati & Porter, 2009). Yet, in some popular media and political circles, economic growth carries with it a stigma – poverty worsens in the wake of economic progress.

The distinction between correlation and causation in this debate is critical. Policy advisors must make the distinction when forming policy decisions regarding economic development in light of reports that seem to link the two. This thesis asserts that linking economic growth directly to individual income as a measure of individual prosperity is too simplistic, and that governance corruption erodes, among other public goods, education. Further, it asserts that certain factors of history, governance, and education effect individual income.

Recall the four conceptual challenges, which concern inconsistent definitions and measurement methods for (1) economic growth, (2) the period analyzed, (3) living standards, (4) corruption. Also, recall the three problem themes. (1) There are gaps in the literature specifically

tying corruption to a mechanism that reduces Income per Capita. (2) Measuring governance, corruption in governance, (aggregate) economic development, and individual income (Income per Capita) levels is difficult. (3) The scope of this thesis necessarily excludes important variables, which serve as a launching point for future research.

The key hypothesis this thesis tested and maintained is: governance corruption's effects on education through the public resource mechanism (Government Expenditure on Public Education as a percentage of Total Government Expenditures) are direct and negative; the higher the degree of corruption, the lower the relative education budget per capita. Further, the lower the education budget per capita, the lower the relative individual income.

In *Governance Matters* (Kaufmann et al., 2008), authors writing on behalf of the World Bank explain the criticality of good governance, sound public administration, and effective public policy. The World Bank embarked on the massive project to understand matters of governance in the early 1990s, in order define its dimensions and measure its effectiveness for future generations; understanding governance to measure it became an international quest. The IMF, World Bank, UN agencies, and other IGOs set a course toward understanding the factors that encourage and that impeding good governance. "Tackling the issue of measuring governance was the premise of a meeting of scholars, data experts, clients, donors, and policy makers at the Kennedy School of Government, Harvard University, in May 2003" (Besancon, 2003, p. 1). Sustainable human and economic development depends on good governance (Sen, 1999). Good governance supports sound public policy, transparent governmental operations, and its fiscal discipline; public expenditures on public goods, including that which is spent on public education, depend on good governance (S. Gupta et al., 2000).

Knowledge about and literature on the links between governance and corruption are not new. Quoting Suetonius (110, p. 82), "Et tu, Brute?" However the literature on links between good governance and less corruption, between weak governance and high levels of corruption,

has become increasingly more frequently published in public policy literature since the 1970s (Rose-Ackerman, 1978, 1999; Abed et al., 2002). The vast body of literature on corruption is inextricable from that of governance, yet yields its own avenues of study. However, grand or petty, political or private sector, rewarded by profit or revenge, malicious or beneficial to the engine of development, governance corruption reduces tax revenue – the government's income stream – and is therefore, detrimental to the budget available to fund public education (deLeon, 1993; Pritchett, 2001; Heidenheimer et al., 2002; Johnston, 2005).

Measuring the effects of corruption and specifically its reduction of a government's fiscal budget, is a discipline aided by the advances in technology and intercommunication between counties in the flattening world (T. L. Friedman, 2005), and it is crucial if policy makers are to create and protect budgets with sound evidence that the budgets may be at risk, and how. Several studies have produced data on the size of the Shadow Economy as a gauge for the degree of corruption in a country. The studies use shared or similar data, and similar (or different) methods to isolate that productivity which goes unreported to the government (Tanzi, 1998; Dell'Anno et al., 2006; La Porta & Shleifer, 2008). While the test results published from these studies report a difference in the magnitude of the Shadow Economy, the variance in the results is relatively small, and is highly correlated across methods. The results are also highly correlated with published data on the level of corruption based on surveys such as the World Bank's *Business Environment and Enterprise Survey* (BEEPS, 2008), and Transparency International's *Corruptions Perceptions Index* (CPI, 2010a). The only study with adequate coverage of Central and Eastern Europe was sponsored by the World Bank and published in 2010, *Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2008*. In this study, the country with smallest estimated Shadow Economy is Switzerland at 8.6%, and the highest is the country of Georgia, at 68.8% (Schneider et al., 2010, p. 27). The size of the Shadow Economy (GDP_U) is added to the size of the formal economy (GDP_O) for the total Gross Domestic Product per country (GDP_T). (Each

GDP figure is normalized by dividing by population for Income per Capita [Ic_O, Ic_U, and Ic_T]). This particular treatment of GPD per capita is different from any treatment of the size of the Shadow Economy uncovered to date in the available bodies of literature and research.

The body of literature around income inequality and converging or diverging incomes has fueled many a debate in the media and between scholars (Kuznets, 1940). However, the data are (at best) misleading without considerable attention paid to context. According to La Porta & Shleifer (2008), official GDP is only 91.4% accurate in the best-case scenario, and on average, 70% accurate. These authors assert "[t]he various estimates thus suggest that, in the average country, roughly 30% of the economy is informal" (p. 9). Some researchers assert that in the former Soviet countries, corruption is systemic (deLeon & Green, 2004), and accounts for far more of the economic activity than studies to date have realized or uncovered (Stefes, 1997). Estimates on inequality can be no more accurate than the data going in, leaving policy makers potentially misinformed. In an effort to produce the most accurate account of individual income, adding that which is *On the Books* of National Income Accounting to that which is known to be *On the Ground* is a step toward accuracy in the convergence / divergence debate. By adding the two streams of income, the data reveal more about the effects of the Shadow Economy on education expenditures than did the data absent the Shadow Economy productivity – results from testing Research Question 3 and Hypothesis 3 tell us that 31.25% of the variation in the change in Education Expenditures (EEc) can be explained by the Shadow Economy (SE_{2008}), at 95% level of significance, on this sample set.

New Growth Theory stands apart from other economic growth theories for three reasons. First, NGT shoulders change, in that the theory allow for changing returns to scale. Regardless of its origin, regardless of its pace, regardless of its variety, NGT is an equal opportunity theory – a requisite advantage in a flattening world (Friedman, 2005). Second, models and equations testing NGT do not force technical accumulation, or any other variable, to be held constant across the

sample set or time (Cortright, 2001). Logically it holds that when adoption is voluntary, if possessing the education required to adopt technology precedes its adoption, and gaining knowledge from the technical adoption follows its adoption, then education is inextricable from the process of technical change. Technology adoption may not be voluntary. For example, analog television signals were phased out in the US, and one invention, the radar gun, shaped the art of pitching baseballs and catching speeding automobiles. When adoption is not voluntary, its knowledge may precede it, may be simultaneous to it, or may lag its arrival, and knowledge gained by it still follows - may be at a similar or different pace.

Pace matters. The pace of adoption and diffusion, the pace of education and knowledge gains, and the pace of other factors of economic growth are each important pieces of the growth puzzle (Maddison, 2009). NGT acknowledges the individuality by country and its methods and models allow for variations in data across countries and over time – aided by advances in computing technology and statistical software that allow for the processing of large sets of cross-country longitudinal data, such as STATA (2007), used to process the data.

Economies cycle – from trough to peak to trough to peak, etc…, measuring a cycle requires discipline - from trough to trough (Burns & Mitchell, 1946; Kuznets, 1940; Schumpeter, 1939), and each country has its own rhythm. Analyzing economic data using arbitrary dates or dates uncoupled from economic cycles, may yield exaggerated results, too high or too low. An example of this common practice would be measuring GDP growth from 1990 to 2000, or worse, the same GDP growth across countries. Policy makers would be better informed if economic data were reported in light of the cycle position. Economies cycle. Gross Domestic Product per capita is an economic factor that follows this rule. GDP per capita cycles, and to inform policy makers with consistent and reliable information, the cycle is measured from trough to trough.

Economies cycle while they grow at an average rate of 2.21% since 1820, and at least 1.4% since the time of Christ (Maddison, 2009, p. 4). Economies grow. Economies may shrink

for a time, they may even feel the effects of a long depression, but on average for over 2,000 years, they grow.

Economies oscillate by the rhythm of the business cycle (about 4 years) (Kitchin, 1923; Mitchell, 1928). Economies cycle in short waves with the rhythm of between 2 and 5 oscillations (about 8 to 20 years) (Juglar, 1893; Rostow, 1975; Schumpeter, 1939). Economies cycle in long waves by the rhythm of 3 to 4 short waves (about 35 to 60 years) (Kondratiev, 1926; Rostow, 1991), and the point in the cycle where a measurement starts or stops is important. Absent information on the phase of economic cycles, it is possible to measure Country A starting at its triple trough (the lowest point in a compound business cycle), against Country B starting at its triple peak (the highest point in a compound business cycle) – yielding an accurate comparison. Suppose the ending data recorded the GDP in the opposite phase of the cycle for both countries. Further, suppose US policy makers are voting on foreign aid for these two countries. Country A's need for aid would likely be underestimated, and Country B's overestimated. Compound this scenario by supposing that Country B is the Country of Georgia, where 68.8% of the total GDP is in the hidden economy.

According to Rostow (1991), each country's readiness for growth, such faculties as infrastructure and fiscal preparedness, lay a foundation for economies to enter a growth stage. Events or political upheaval may trigger a trough (*e.g.,* natural disasters such as Japan's 2011 earthquake, or acts of aggression such as Japan's attack on America's Pearl Harbor). Events or innovations may spark long wave growth (*e.g.,* the industrial revolution, or the personal computer). The political upheaval in 1989 was the dissolution of the Soviet Empire, the fall of the Berlin Wall, the lifting of the Iron Curtain, the dismantling of USSR's economic and governance infrastructure, and the subsequent governance and policy challenges facing re-born states with still open scars of the Cold War. Shock waves of change hit the neighboring states, and radiated outward to those states bordering the Eastern Bloc. After the political shock, each of the economies suffered. As

seen in Appendix B, Figure 6, each country experienced at least one trough as measured in Income per Capita. Most countries show evidences of more than one cycle, and some a double-dip trough. Many economic factors that affect the GDP and economic cycles of Eastern and Central European Countries are outside the scope of this thesis.

The slice of enormous body of literature on measuring education pertinent to this thesis measures the Government Expenditure on Public Education as a Percentage of Total Spending (EE) as found in UNESCO's *Global Education Digest* (2010, Table 13), and the 2011 World Development Indicators statistical database (HDR, 2010f). The process of educating is outside the scope of this thesis. The budget figure EE is normalized by dividing by population (EEc).

Central and Eastern Europe, as a region is "geographically imprecise" (Kornai, 2005), at least in part due to the geography, but also due to its changing authorities since the fall of the Roman Empire in 1453 (Robinson, 1902, p. 356). It was Winston Churchill, in his *Sinews of Peace* Speech, who effectively drew the map for the land beyond the Iron Curtain.

From Stettin in the Baltic to Trieste in the Adriatic, an iron curtain had descended across the continent. Behind that line lie all the capitals of the ancient states of Central and Eastern Europe. Warsaw, Berlin, Prague, Vienna, Budapest, Belgrade, Bucharest, and Sofia, all these famous cities and the populations around them lie in what I must call the Soviet Sphere, and all are subject in one form or another, not only to Soviet influence, but to a very high and, in some cases, increasing measure of control from Moscow (Churchill, 1946).

'Socialism' is also imprecise. So are shadow, parallel, and unofficial markets by any name. It is the effect of Socialism, governance, corruption, and the effect of the Shadow Economy that must be measured to provide policy makers with the fodder they need to make critical development funding decisions.

Finally, the data provide evidence to inform the development policy debate in several critical areas: economic development, fiscal policy, education funding, and corruption in govern-

ance. The application of the method used to measure total income and education funding is distinctive to this thesis, while the findings are consistent with published research Mauro (1998). The data show that governance corruption's effects on education through the public resource mechanism are direct and negative; the higher the percentage of corruption, the lower the relative education budget per capita, affirming prior work by Mauro (1998), Tanzi (1998), Pritchett (2001) and others. Further, the higher the percentage of corruption, the lower the relative individual income, affirming New Growth Theory (Romer, 1998b).

Data Limitations

The concepts of governance, corruption, parallel economies, and government accounta-bility, are not easily measured nor are they naturally calibrated to each other. For purposes of comparison, testing, and regression, a common denominator or an index simplifies the equations and helps the researcher make sense out of the test results. This requisite forces the difficult step of calibration to come first. In an international endeavor to accommodate the needs of the re-search community, the leading international agencies have each launched divisions dedicated to statistical capacity building and data collection. The rapid advances in computing technology and software has enabled and stimulated quicker analysis, new methods, and more robust testing, ex-amples of which follow. However, the added statistical capacity meets with frustration for some researchers.

Governance's most widely accepted barometer is the World Governance Indicators (WGI) – most of the data are survey based. The most widely accepted barometers for corruption are the Global Corruption Barometer, and the Corruption Perceptions Index, which are both sur-vey based. The European Bank for Reconstruction and Development (EBRD) issues the Business Environment and Enterprise Performance Survey (BEEPS) every five years. A robust survey of over 15,000 professionals, the BEEPS scores offer a broad look at the corruption in the business sector, or between business and government. While the BEEPS would inform the rent seeking reports, it does not measure the rent seeking in a dollar figure. The Shadow Economy is estimat-ed by the Bribe Payer's Index, Economic Freedom Index, and by various gap analyses such as electricity demand, consumption demand, arbitrage, and tax gaps. These gaps purport to measure that which is missing from or avoids the official economy. These methods presume to measure corruption's effect on the economy by back filling – that is, by filling in the gaps in information found by auditing.

Research is underway to codify factors of governance, corruption, and transactions missing on official registers. Today, however, each of the estimating methods lacks precision, so do analyses based on them. From the UN's Millennial Development Project to researchers on the ground, creating better measures and methods for estimating the efficiency and effectiveness of government is a top priority. Comparing this author's first experience collecting data on income inequality and government effectiveness in 2005, to the experience collecting the same data today is a challenge; very little about the experiences are the same. Following are three disciplines with significant overlap that may inform future research.

(1) Technology improvements in hardware, software, and computing capability.

(2) Digital communications, and digital library resource catalogs, and resource availability.

(3) Increased collaboration between international agencies, data availability, and data consistency. In six years, the change is extraordinary in every way, which serves as the basis for this first caveat. Another year would likely produce more robust results and additional insights. For now, the most objective method to estimate corruption's effects on education expenditures and individual income in the Eastern and Central Europe is the MIMIC method on the Shadow Economy data produced by Schneider et al. (2010).

Next, UNICEF was the agency responsible for collecting data on education expenditures by country every five years from 1965 until 1988. Submissions of national accounts data on education were voluntary and inconsistent. UNESCO undertook the task of standardizing education statistical data and its collection, collecting its first round of data in 1998. Data representing education expenditures as a percentage of total government expenditures is limit until 1988, scant from 1988 to 1998, and nearly 100% from 1998 to 2008 on the sample of countries in this thesis. The lack of data availability for this project's needs and for similar projects by many other researchers in similar want of good education data is the basis for this second caveat. Based on this author's research, none of the agencies has plans to backfill the government expenditure data.

Therefore, the acquisition of additional or more robust measurements of education funding will remain elusive, unless the education data may become apparent through backfilling.

The global push by the international agencies for better data and statistical capability through the implementation of international accounting standards is underway at the IMF and World Bank. This step will provide data to complete country-to-country gap analyses. The augmented data can feed consistent methodologies, primary governance research on the ground, and many other initiatives, which will likely induce extraordinary change in the next six years as it did in the past six.

The Shadow Economy as measured by the MIMIC method is one of many methods used in recent research to estimate the scope or size of the unofficial economy in a country. While the methods are highly correlated, each has limitations, and the Shadow Economy may overstate or understate the actual unofficial economy. Prudence may suggest that policy analysts employ more than one measure and method to estimate the extent of the unofficial economy in a given country.

Thirdly, the method used to test governance corruption's effects on education budgets and income is generalizable and scalable to the balance of the 194 sovereign countries recognized in the world today. Analyzing the balance of the countries may be beneficial to policy makers in many ways. While data advance, measuring the effects of governance where data is available may highlight new results or different relationships. The sample set of countries analyzed herein represent all of the former USSR (15 countries in Group 1) and its satellite states (15 countries as of 2008 in Group 2). However, a third group of only six countries in Central Europe fall into or could fall under the rules set out to isolate Soviet influence. (See Appendix: Country Briefs, Group 3). Recall the following is the list of rules for inclusion in the Sample Set of Countries.

Rule 1: The country was or remains Socialist

Rule 2: Four or more years of Soviet influence (Sachs & Warner, 1992, 1996, 1998), plus a created, liberated, or re-gained sovereignty, independence or the ability to trade, travel, and migrate which began between 1988 and 1992.

Rule 3: Geographically related by inland border, trade route, or sea-trade route

Rule 4: Ethnolinguistically interrelated, Economically interdependent

Using different rules or relaxing these rules, including additional countries in Europe to increase the sample size, or analyzing different country groups based on these or other criteria may yield different findings. For example, the OECD nations, the balance of Europe, and many other countries have data on the Education Expenditure and Shadow Economy variables. Analyzing these additional countries may expose findings specific to the Central and Eastern European data set that are due to the particular countries in the set. Exposing findings peculiar to the data set used in this thesis necessarily requires comparison against other sets of countries.

A fourth and a major limitation to this data is its narrow scope. Many variables that are widely used in cross-country analysis on economic growth and individual income in transition countries are beyond the scope of this thesis. Specifically, future research on this sample set would include three important variables. (1) A variable critical to economic productivity would measure progress toward market liberalization. In the 2010 Transition Report, the EBRD offers a "new sector-based approach to measuring transition progress," which provides data on privatization, markets, banking, and infrastructure (p. 3). (2) Progress toward EU accession, measured by the European Commission (2011b). (3) A variable critical to understanding economic growth patterns would mark the history and intensity of armed conflicts (HIIK, 2010a).

Other variables that are nonspecific to transition countries are left for future research. Specifically missing are (1) the variables for public expenditure on public goods other than education, and the policies that surround those goods, (2) variables that measure the education plant

after funds are appropriated and through performance; the area this thesis avoids, treating 'education' as a black box. (3) In addition to the public goods variables, the remaining dimensions of governance (Kaufmann et al., 2008) interplay with education and its funding. Isolating education is as fragile as the ceteris paribus assumption – that all else remains unchanged – is permanent.

Fifth, the elementary level of econometrics performed on models may leave inside much of the information possible to extract from this data, would an econometrician be at the controls. Further, the more robust tests, better analysis or more intricate modeling may uncover different findings that support either better or worse, the hypothesis herein.

Lastly, and possibly most importantly, the data do not have in them the ability to predict beyond the forecasting, which is based on imperfect empirical data and extrapolation, and inclined to human error. The ceteris paribus assumption creates risk for the policy analyst, and builds error into any equation. In turn, the policy makers are at risk of ill-informed policy.

CHAPTER 6

CONSLUSIONS AND FUTURE RESEARCH

Conclusions

The analyses presented above suggest clear evidence that as the size of the Shadow Economy increases, the budget for Education Expenditures as a percentage of the total government expenses decreases. There is also evidence that as the Shadow Economy increases and Education Expenditures decrease, individual income decreases as well. These findings are consistent with New Growth Theory, which posits that the quality and quantity of education specifically, provided as a public good, is critical to a healthy and sustainable economic development. The practical application of this evidence is different, in that education expenditures and individual income are analyzed together and in light of the effect of corruption on them. This process requires that we compare the results of three equations: (1) Official Income per Capita, (2) Unofficial Income per Capita, and (3) Total Income per Capita.

Minimizing corruption, the ideas, case studies, and methods form a large body of literature, much of which is outside the scope of this thesis, but the motivation for policy makers to minimize corruption may be greater in light of this new analysis. Two points with the potential to affect the policy agenda deserve repeating. (1) Data do not support as a sustainable solution the allowing of petty corruption as a means to grease the wheel of the economy (Gupta et al., 2000, p. 9). (2) Corruption is still corrupt, and there is no evidence in this analysis that small-scale, or Grande, black, white, or grey, Big "C" or little "c," that corruption pays the average individual well over the long term (Rose-Ackerman, 1999a, pp. 16, 26). Eventually, society corrodes, school quality decays, infrastructure suffers, budgets for research and development shrink, and the economy implodes onto itself, not unlike that described in Levy (2007) since the end of the

Cold War, and not unlike the implosion of the Soviet Union itself. The IMF describes the process in *The IMF and Good Governance* (2011d).

Corruption can reduce investment and economic growth; divert public resources to private gains and away from needed public spending on education and health…. By reducing tax revenue, corruption can complicate macroeconomic management, and since it tends to do so in a regressive way, it can accentuate income inequality (IMF, 2011d, p. 1). DeLeon asserts that ridding a society of its corruption is unlikely, as "[i]t is sown in Corruption" (quoting 1 Corinthians 15:42, 1993, p. 3). While petty or little 'c' corruption may 'sown in' to the fabric of cultures, informed policies may dissuade some of it. To do so, Rose-Ackerman (1999a, p. 4) suggests reforms in governance, especially in the rule of law.

Reforms can reduce the incentives for bribery and increase the risks of corruption. The goal is not to eliminate corruption, but to improve the overall efficiency, fairness, and legitimacy of the state. Hopes for total elimination of corruption will never be worthwhile, but steps can be taken to limit its reach and reduce the harm it causes.

Focus on policies that promote vertical and horizontal accountability in both state and non-state institutions may dissuade corruption. These may include policies intended toward whistle-blower protection, incentives, enforceable penalties, and more significant fines (Relly, 2011, p. 5; Rose-Ackerman, 2008).

A summary of the applicability of governance corruption in the process of education policy making, cites four major ways in which corruption targets public budgets; through rent seeking, state capture, control, and bid-rigging. Education may be an attractive budget to target, as the effects may be hard to detect, or help to realize a private or cooperative motivation.

(1)Rent seeking that is easy to hide from public view. Education will likely continue with old books, buildings, and technology, thus, its funding is easier to reduce without much

more attention than, say, a bridge. Actions such as this are rent-seeking, "leaving the education sector under-resourced" (TI, 2009b, p. 2).

(2)State capture, in the form of collusion, that is difficult to identify and even harder to trace to its source. Rose-Ackerman (1999a, pp. 26, 32) asserts that education facilities will likely remain without new desks, thus, its funding is easy to divert to provide remuneration for a corrupt act.

(3)Control over the masses by controlling the quality, quantity, or content of education. One method may be censorship. Some scholars assert the possibility that education of the general population is not in the best interest of a corrupt ruling party. A corrupt individual or powerful institution may advance the type of education that furthers a specific agenda (Freire, 1970, pp. 55, 81, 135).

(4)Bid-rigging (no-bid or sole source contracts, contract favoritism) assures that contracts are awarded to a particular supplier or firm and clientelism, cronyism, patronage, or nepotism may sway contract decisions (Rose-Ackerman, 1999a, p. 27). According to Mauro (2002, p 278), "[e]ducation stands out as a particularly unattractive [rigging] target" for two reasons. (a) Contracts for school supplies are small-scale relative to defense or transportation contracts. (b) School systems need relatively low technology while rigging requires "widely available, mature technology" (p. 277). Allocating funds away from the education sector and toward, for example, defense contracts, would be one way to manipulate public budgets. The "direction of the causal link is at least in part from corruption to the composition of spending" (p. 277).

Education's positive externality is questioned. Despite the assertions of many researchers (*e.g.,* Romer, 1986, p. 40; Arrow, 1962; Solow, 1957) that education "spills over" to other learners and to other disciplines, and therefore, has an increasing return on investment, the evidence is mixed. The question becomes, how or why does the money spent on education not spillover, take root, and bloom into new knowledge and a more educated society? If, in fact, the money is

reaching the level of the student, or to the extent that it does, what is happening to the value education passes on? Does it evaporate? The answer may be in accordance with Ofer (1997), that the unofficial economy is realizing the gains. Another debate is whether knowledge spillovers mete out different results, since knowledge is owned by the individual actor rather while education is merely available and to a questionable degree.

However well intended the Constitution of the Soviet Union, however well intended the leaders, human development and a broadness of education, among other factors, suffered in the hands of the Soviet Empire. Moldova, Tajikistan, Kyrgyzstan, Ukraine, and Serbia have yet to realize the GDP per capita known to each country prior to the dissolution of the USSR. Certainly, other factors are involved, but of those, are any very far removed from corruption? The average Shadow Economy in these five countries is over 50%. The average GDP per capita $762 per year and including that gained in on the ground is $939 (stated in US 2000 dollars) (Schneider et al., 2010). These GDP per capita levels are similar to those found in the lowest earning regions of Africa. It seems illogical that a corrupt individual would willingly advance the type of education that others could use to unseat him or her, as a matter of simple self-preservation (Freire, 1970, pp. 55, 81, 135); Monas (1984) provides the following account.

> Institutional censorship plays an especially harsh, continuous, wide, and deep
> role in Russia…. The related "sacral aura" or sacred pretension that surrounded
> that power had to be protected from irreverent attacks or underminings, in the in-
> terests of stability. Of course, the interests of stability are generally the interests
> of the ruling class, of the 'fathers', the patricians (p. 166. emphasis in original).

Systemic, pervasive corruption does not pay off for the average individual in the long run. Research is ongoing by the IMF and the World Bank to separate or isolate the effects of governance corruption in the funding of different public goods, efforts that may inform hypothesis in this thesis.

Economies cycle; economies oscillate from trough to peak to trough to peak. Measuring a cycle requires discipline. GDP cycles start at the bottom of a trough and end at the bottom of

the next trough (Burns & Mitchell, 1946; Kuznets, 1940; Schumpeter, 1939), and each country has its own rhythm. Gross Domestic Product per Capita is an economic factor that follows this rule. GDP per Capita cycles. Encouraging policy analysis to weigh the economic cycle when producing formulas, models, and equations is responsible, intelligent analysis.

This thesis provides a strong case for transparency in National Income Accounting. As more countries embrace transparency, more countries that share data may uncover more evidence of the Shadow Economy's ability to avoid detection. Backfilling the missing information available on one side of the transaction will take time and research, work that is ongoing through international agencies such as Transparency International and the IMF. Increasing sanctions for lack of transparency are increasing, as well.

Sustainable development depends on many factors, one of which is an educated populace, who are capable of adopting the technology that drives economies to a new steady state (Schumpeter, 1939). Incentive to produce within the governance system must outweigh the incentives to produce *Off the books*. As Tanzi (1998) noted, there is both a supply of and a demand for corruption. As incentives to engage in corruption decrease, as the remuneration dries up, the demand to engage in corrupt behaviors should decrease. Proper audits, oversight, policies, law, and consequences may reduce incentives to supply or allow the means or the remuneration for corruption.

The next step for research in this area is to provide policy makers evidence to support protecting the education budgets, specifically. Milton Friedman (1997), arguing against publicly funded education, foresaw this education funding dilemma, asserting very generically that where the public money goes, so goes the corruption. Possible research areas would be methods of funding for education that protect the funding stream, such as conditional block grants or matching grants. Research in this vein would assist in the education policy planning and education budgeting stages.

Another vein for future research would inform policy implementation. If corrupt institutions are part of the problem in the delivery of the education product, then an international agency, consultant, or a funding source such as US AID that will provide funding conditional on also providing the policy planning and work force to implement it (deLeon & Green, 2002) may best handle implementation. Research on implementation strategies may inform policy makers about approaches that protect the funding stream, and ensure that funds progress to the level of the schools, or better, to the level of the student. If the funds are secured to the level of the school, if education is made available and the availability is monitored by outside agencies, new data may be collected to further knowledge about the value of education on human development and economic growth. It is likely, however, that changing the funding mechanism and level would bring about its own challenges, as corruption follows the available reward to its new source.

Susan Rose-Ackerman (1999) suggested an international tribunal could govern international corruption issues. However, if corruption is "sown in" to the fabric of our being and therefore of our society, the budget for thwarting it globally may be out of reach (deLeon, 1993, p. 3. quoting 1 Corinthians 15:42). Accepting that some corruption has and will always be part of the polity, theoretically, suggests the need for a sieve through which petty corruption passes, exposing the bigger crimes. This would necessitate a rule of law that invites and protects whistle blowing.

Protecting education budgets from state capture, rent seeking, and bid-rigging starts with acknowledging that education budgets are susceptible – even likely – targets. Further, protection must continue through the policy process. Several suggestions for this protection are found in Lester Salamon's (2002) *Tools of Government*, and Rose-Ackerman's *Corruption in Government* (2008, p. 340).

Future Research

The first priority in future research is to pick up the analysis of the Shadow Economy's effects on education budgets and individual income, where it left off. Many studies on economic growth use cross-country analyses, and many use conditioning and dummy variables with robust econometrics. Transition country studies, in particular, generally employ three important variables: (1) Progress toward market liberalization. In the 2010 Transition Report, the EBRD offers a "new sector-based approach to measuring transition progress," which provides data on privatization, markets, banking, and infrastructure (p. 3). (2) Progress toward EU accession, measured by the European Commission (2011b). (3) Accounting for the history and intensity of armed conflicts (HIIK, 2010a).

Another future research project would include additional variables that are nonspecific to transition countries, but are common to cross-country regression analysis of time-series data. A partial list of these variables would include data on: (1) Public expenditure on public goods and infrastructure (in addition to education). (2) The policy implications central to the budgeting and delivery of those goods. (3) Education funding research that isolates effectiveness and efficiency in the education plant. (4) The remaining dimensions of governance (in addition to public goods) (Kaufmann et al., 2008). (5) Interplay between education, and other infrastructure or public good funding and the composition of government revenues.

The method used to test governance corruption's effects on education budgets and income is generalizable and scalable to the balance of the 194 sovereign countries recognized in the world today. Analyzing the balance of the countries may be beneficial to policy makers in many ways. While data advance, measuring the effects of governance where data are available may highlight new results or different relationships. The countries bordering the Eastern Bloc, along the Iron Curtain, are likely to be effected by its creation and demolition, (Diamond, 1997; Elisseeff, 1997) (See Appendix: Data Validity and Reliability). Then, the countries with regional

trading ties and ethnolinguistic similarities would make another logical grouping, followed by adding the Western European countries to the sample set. Rather than geographical groupings, one might sort the 194 sovereign countries based on many factors, including the number of years of governance stability, Communist rule, centralized planning, democratic rule, or armed conflict.

Kuznets' economic paradigm was the genesis of this thesis, which can be translated to a Kuznets Curve for education, not unlike the Kuznetsian curve for the environment (Stern, 2003). His original curve contrasted Income per Capita against Income Inequality over time, where 'time' started with a less mature state characterized by a more dispersed and agrarian population, moving toward a population concentrated near industrial centers and a more specialized work-force population. The Kuznets curve and the cycle that societies move through, a Kuznets Cycle (Kuznets, 1934, 1940, 1966) are represented in Figure 6.2. The basic Kuznets Curve shows income inequality increasing and the decreasing over the cycle.
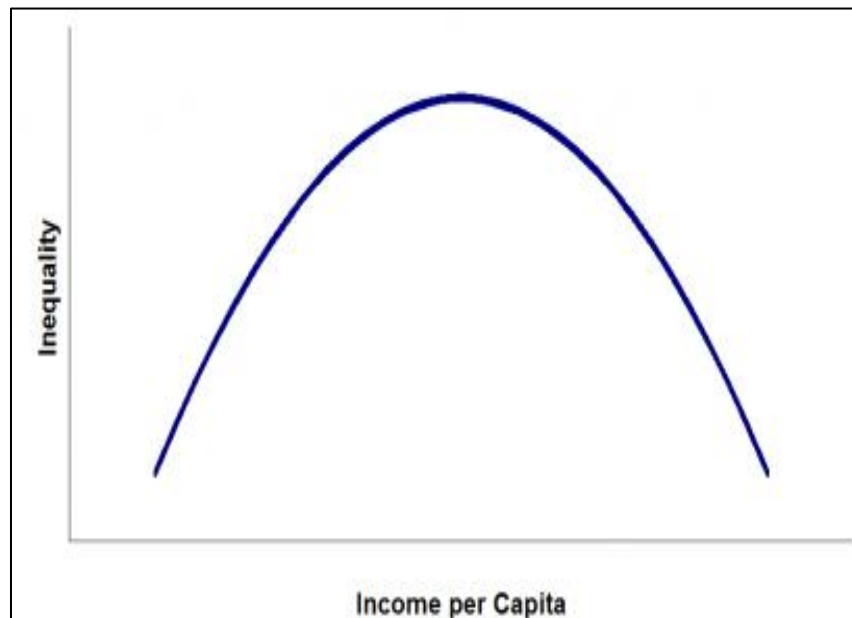
Figure 6.2 The Kuznets Curve (1966).

Applying the general principles of the original and the environmental Kuznets curve to a model similar to that found in equations 4.1-4-3 in this thesis may yield important policy information for analysis and administrators alike. This model would graph education funding over the

maturation cycle of a governance regime With information on the effects of the Shadow Economy on education funding, one could employ a MIMIC equation used in Schneider et al. (2010) to create the Educational Kuznets Curve seen in Figure 6.3, which shows the effects of governance corruption on education funding in the instance of a newly independent state.

Educational Kuznets Curve
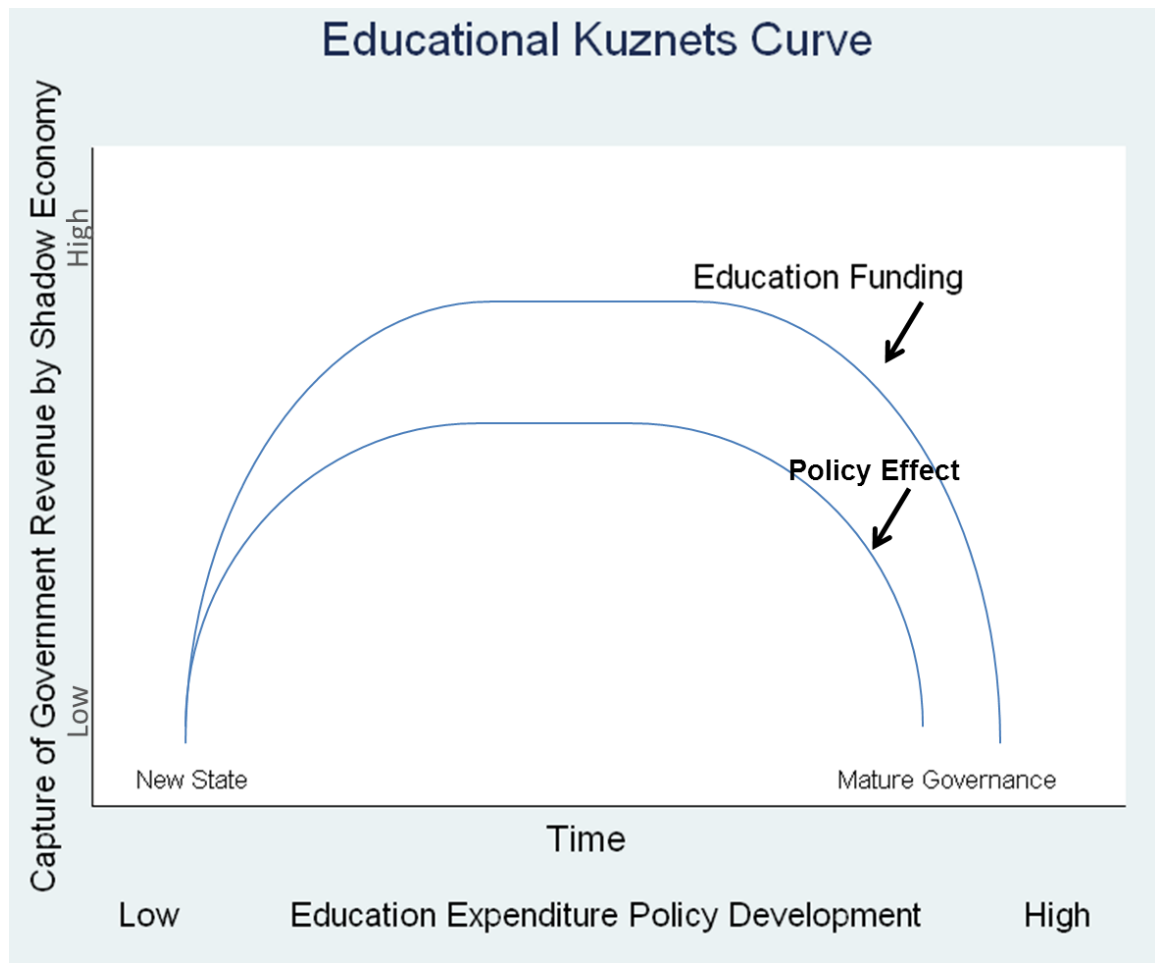
Figure 6.3 Educational Kuznets Curve (author's depiction).

The Educational Kuznets Curve shows a divergence in the funding of education as a country from when it embarks on a path toward a on a campaign toward good governance. During this period, and relative to the degree of good governance, the hidden economy prospers. As governance in the new state matures, and as the rule of law becomes more enforceable, as development policy matures, more productivity moves into the official economy (Kornai, 2005; Mauro, 2004a). We can assume this movement of productivity to the official economy increases

available funds for public goods, including education spending. The education inequality would decrease over the latter half of new state governance implementation.

This idea has important implications in development and sustainability. Rather than a new state falling victim to a full cycle of governance maturity, proactive development planning could arrest the cycle, or prevent it. Following is the sequence of logic. Mauro (1998), Barro (2001), and Solow (1956), among others, assert that education is fundamental to economic growth. The correlation coefficient between EE (lagged variable that averages from t-10 to t-18 years) and ΔIc is .8667. According to Mauro (1998, 2000, 2002), Tanzi (1998), and Pritchett (2001), education funding suffers in the presence of corruption. In this thesis, a comparison of the R^2 test between two OLS regressions was consistent with these authors. The dependent variable is ΔIc, the HDI_{1990} is the independent variable for the first equation and the Shadow Economy is added to the second equation. The R^2 of the augmented, second equation is higher, from 40.62% to 48.44%. Schneider et al., (2010), Russell (2010), and others assert that unofficial economic activity, including those specific to the Shadow Economy, diverts income from the official GDP and toward unofficial economic activities (p. 5). The average Shadow Economy size for the thesis' sample set of countries is 30.32%. Last, variation in the ΔHDI, and ΔEEc, together account for 54.04% of the variation in ΔIc_{Total}.

Education Inequality is especially limiting in developing nations as research shows the direct and positive relationship between good education and positive economic growth (La Porta & Shleifer, 2008). Beyond the education funding issue, education inequality affects nations through limiting access. Studies show diverging education between the wealthier and poorer while the governance system matures (TI, 2009b).

Would a country be better off if education were a protected economic asset? Consider the long-term detrimental effects of inadequate education on economic development (Barro & Lee, 2001; Romer, 1986; Sen, 1984, 1997, 2004; Tanzi, 1998). One might compare the R^2 values

of the change in income per capita of two sets of transition economies that gained independence during the dissolution of the USSR. The Group A Countries adopted a democratic political system, embraced good governance and transparent government, and prioritized education in the spending on public goods. The Group B Countries did not. Hypothesis 1 is that the change in Income Per Capita is higher in Group A. Hypothesis 2 is that duration of the Educational Kuznets Curve would be shortened, and hopefully, the divergence in education equality shorter. Measured by the rate of increase in economic growth between the two groups, the time period for economic recovery after the trough sparked by a regime or political shift (Rostow, 1991), Group A would outpace Group B. Additional work furthering the idea of the Educational Kuznets Curve is critical.

Future research that conjoins the officially and unofficially earned income would promote better-informed policymaking at every level of government. Research that marries the income sources with planning in the policy budgeting process, policy analysis, stages of economic growth, and economic cycle position would promote better-informed policy making, as well. Lastly, adding to the economic development planning process reminders that education's budget may be a target for corruption, and that education's budget, when protected, may produce increasing returns, is vital to informed, responsible policy.

APPENDIX A: COUNTRY BRIEFS

Region

Geographically, the sample set of countries lay in Central and Eastern Europe. The countries chosen for this analysis where selected in part for their commonality, to minimize the scope of determining factors on governance. The countries occupy the former Eastern Bloc, the Balkan Peninsula, border the Adriatic Sea, or they border counties that do. The "Iron Curtain," figuratively, is the veil "[f]rom Stettin in the Baltic to Trieste in the Adriatic" east of which reigned "Soviet influence" and an "increasing measure of control from Moscow" (Churchill, 1946). The effects of the iron curtain on European countries boarding or west of this "Soviet Sphere" (1946) may be different by physical magnitude or psychological impact, or, may be the same; the force field went up, and came down, on both sides of the veil. Likewise, construction, patrol, and demolition occurred on both sides of the Berlin Wall (Ofer, 1987). The sample set of countries, based on geography, are those most affected by the Soviet radiation outward from Moscow in concentric circles, and from its Satellite States.

The sample countries are, and were, economically inter-dependent. Centuries of trade relationships and routes preceded these new alliances (Elisseeff, 1998), and the same or new routes opened after the dissolution of the former USSR (WTO, 2010f). (See Country Briefs). Similarly, migration routes and shifting empires facilitated the intermixing of nationalities, ethnicities, religions, languages, customs, and disease (Diamond, 1997; Alesina et al., 2002). Thus, the sample set of countries share, in varying degrees, similar ethnolinguistic heritage.

Socialist Countries in Central and Eastern Europe

The goal in this section is to define *Socialist* as used in this thesis. According to Jonas Kornai (1993), literature and the media intertwine terms and confuse meanings for the political systems in Central and Eastern Europe. The term *socialism* "frequently used by politicians and by the press outside the socialist world is 'communist system' or simply 'communism'…[to re-

fer] to the political economy of communism" (p. 10). [He concludes,]…the choice of the term is a matter of semantics, as long as the meaning is clearly defined..." (p. 10).

Socialist as used in this thesis refers to a sovereign nation's political economy, and is unconcerned with a traditional placement on a left-right or liberal-conservative spectrum. According to Kornai, a Socialist political economy centralizes the authority of planning the economy and where the state also controls decision on "production and consumption, investment and saving,"…"the distribution of income" and economic efficiency (1992, p. 4). For this thesis, Statism, and Fascism are both socialist, as are Socialism, Communism, Collectivism, Nazism, Marxism, Stalinism, and Leninism.

Inclusion in the Sample Set of Countries

Rule 1: The country was or remains Socialist

Sachs & Warner (1995) and Kornai (1993) among others deliberately include in data sets, countries which endured "at least several years" of Communist influence, and which that ruling party declared it was Socialist (Kornai, 1992, p. 4). For this thesis, it is paramount that the countries endured at least several years of extraordinarily influence by the Soviet Empire, and has since endured the development effects of its demise, either positively or negatively. These effects may be cultural, shifts in population densities, related to trade relations before, during, or after the Cold War, shifts in economic strengths, political and governance systems, or a multitude of other factors either undiscovered or outside the scope of this thesis.

Rule 2: Four or more years of Soviet influence, plus newly created, liberated, or re-gained sovereignty, independence or the ability to trade, travel, and migrate

Other scholars use different criteria to include or exclude in studies counties that occupy Central and Eastern Europe. Dividing the former USSR states into those that joined certain alliances such as the Commonwealth of Independent States (CIS), for example, or the later, the Collective Security Treaty Organization (CTSO), or the Eurasian Economic Community (EAEC),

is not workable over time, as each of these organizations has shifting membership. In addition, not one has always included all of the former USSR countries, and at no time has Hungary, Yugoslavia, the Czech Republic, or Albania joined the organizations, according to the World Trade Organization (WTO, 2010h). Other methods to separate or group countries exist, for example, countries were dissected by factors such as ethnolinguistic homogeneity (Alesina et al., 2002), instability by number of coups (Barro, 1991), and religious affiliation (Barro & McCleary, 2003).

Rule 3: Geographically related by inland border, trade route, or sea-trade route

Geographically, the sample set of countries lay in Central and Eastern Europe. The countries chosen for this analysis where selected in part for their commonality, to minimize the scope of determining factors on governance. The countries occupy the former Eastern Bloc or Soviet Sphere of Influence (Hirsch et al., 2002) or they border (significantly) counties that do.

This thesis does not include China or other Asian countries as inclusion would require research and data for dummy variables on other geographic and cultural issues beyond the scope of this thesis. This country grouping is consistent with the Schneider et al. (2010). For the same reason, former or current communist countries that are geographically distant from the former USSR, such as North Korea are not included.

Rule 4: Ethnolinguistically interrelated, Economically interdependent

The Central and Eastern European countries are ethnolinguistically and economically linked, trade among and between these countries survived the Iron Curtain (Ofer, 1987), or was revived at its crumbling; each country was part of the Warsaw Pact, or of NATO, or the country was economically affected by the division between them. Two countries offer examples show extreme reasons for necessary inclusion to the sample set.

The first example is Czechoslovakia in 1968. Unwilling to be part of the security alliance, it invaded by the Warsaw Pact members (save Romania), and inclusion in the Warsaw Pact was forced upon it. For several reasons including this, Czechoslovakia must be included in the

sample set (DOS, 2010b, p. Czechoslovakia). The second country is Italy, providing two examples of ethnolinguistic fractionalization. Before and during WWII fifteen-hundred Italian men went to work for Volkswagen in Germany as expatriates, and were not allowed to return home. In fact, over seventy percent of the labor force of Germany consisted of foreigners, mostly from Poland and Italy, and Soviet prisoners of War (Burleigh, 1996, p. 43). Over Seventy-five hundred Italian Jews were victims of the Holocaust alongside the two million Soviet Jews and two million ethnic Poles (DOS, Russia, p. People). Prior to the Berlin wall closing migration, Germans fled west. In the summer of 1991, during the "great East-West migration," over 35,000 Albanians migrated to Italy to join family, gain employment, or seek asylum from the Albanian government (Böcker et al., 1998, p. 232). Millions of people migrated west after the fall of the Berlin Wall, creating or re-creating trading ties with the dawning of a new era in Central and Eastern Europe in the late 1980s and early 1990s (pp. 259 - 260). The economy of each county in the sample set was affected greatly by the dissolution of the USSR. The ethnic, cultural, religious, or linguistic history differs by country, which effects economic growth (Alesina et al., 2002). Russia's 139.4 million citizens descend from more than 100 ethnic groups (p. Russia, People), while over 92% of Hungarians claim Hungarian ethnicity (p. Hungary, people). Inclusion in the sample set required certain levels of Soviet influence, as well. Soviet influence, degree of heterogeneity, and economic interdependence provide a reasonable grouping to study (Alesina et al., 2002).

Trade relations link these countries before and after the fall of the Berlin Wall. From a primarily closed economy in 1989, as of 2007, Russia is the thirteenth largest exporter and nineteen largest importer of goods in the world, with trade relations between countries from both the NATO and Warsaw Pact trading alliances, and from both sides of the Iron Curtain. Netherlands buys 10.62% of Russian exports, Italy buys 6.46%, Germany 6.24%, China 5.69%, Turkey 4.3%, and Ukraine purchases 4.01% of the $303 billion in total exports. In 2008, Russia imported $191

billion in goods, Germany provided 14.39%, China 13.98%, Ukraine 5.48%, Italy 4.84%, and the

US sent 4.46% of the total imports (CIA, 2009, p. Russia).

The dissolution of the former USSR disrupted the economic equilibrium of Eastern Europe.

> [There] has been the steep collapse of trade among the countries of the former
> Council for Mutual Economic Assistance (CMEA). In part, the collapse has re-
> sulted from a decline in Russian sales of oil and gas to Eastern Europe. In part,
> exports of military equipment to the region have declined…. Overall, Russia's
> exports to the CMEA countries declined steeply, from an estimated $40.1 billion
> in 1990 to $15.9 billion in 1991 (Lipton et al., 1992, p. 225).

The breakup of the former USSR also brought on one of the most profound and far-

reaching transformations of the twentieth century. The disintegration of the command structures

in the old regimes triggered some of the most chaotic economic, political, and social changes in

modern history Abed et al. (2002a).

Country Briefs

The following Country Briefs present evidence and data relevant to this thesis on three groups of sovereign countries as of 2008. Group I consists of fifteen countries that occupy the geographic area of the former United Soviet Socialist Republics (USSR or SSR for an individual Republic) as of 1989. Group II consists of fifteen Eastern Bloc countries during and after World War II until 1998 (Beissinger, 2006). The term "Eastern Bloc" is "[t]he name applied to the former communist states of Eastern Europe, including Yugoslavia and Albania, as well as the countries of the Warsaw Pact" (Hirsch et al., 2002, p. 316).

Group III is for data validation in this thesis. It consists of six countries extraordinarily influenced by the Soviet Empire, that maintain a communistic or socialistic authority, were occupied by or that operated as a Satellite State or Puppet State of the Soviet Empire. "A satellite state (sometimes referred to as a client state) is a political term that refers to a country that is formally independent, but under heavy political and economic influence or control by another country" (Hirsch et al., 2002, p. 316). Following is the rule of thumb for inclusion in Group III. The country: 1) is socialist, 2) was occupied by or allied with communist rulers through a satellite relationship, 3) is situated within Eastern Europe, Central Europe, or Central Asia and bordered the USSR, 4) shared strong ethnolinguistic, migration, and economic history (Elisseeff, 1998), 5) was not part of the USSR, and 6) maintains strong trade relationships with countries in Groups I and II (CIA, 2009). The countries in Group III are Austria, Finland, Greece, Turkey, Italy, and Cyprus.

Unless otherwise noted, the six sources for corruption, governance, historical, and demographic data and information follow. 1. The States Department of State (DOS) electronic public library, *Countries and Regions: Background Notes* by country (DOS, 2010c). 2. The Europa World Year Book (Europa) by country (Maher, 2008). 3. The 2006 United States Agency for International Development (USAID) Anti-Corruption Final Report (2006), the US Library of

Congress (2010), and (CIA2009a). Schneider et al. provide the Shadow Economy figures (Schneider et al., 2010a) unless noted otherwise. The Country Briefs assume 1990 for the pre-test year (HDI_{1990}), and 2007 for the post-test (HDI_{2007}), unless otherwise noted. In each case, if 1990 and 2008 data are not available, the data reported are the closest available to the test dates and are noted. Human development and economic statistics data originate from the Human Development Report (HDR) statistical database found in the 2010 report, or in prior year HDR reports as noted by the report year (2010). The 1993 HDR report provides HDI_{1990}, unless 1990 data are unavailable, in which case this section cites the report where the data are available for the earliest possible year. However, this citation does not hold for the Human Development Index data. The HDI researchers made an adjustment in the methodology inversed the ranking order so that high rankings are equivalent to high human development levels after 1995, when the inverse was the standard in the initial years of the HDR. The Annex to the 2009 report, HDI Trends and Indicators (1980 - 2007), provide the HDI_{1990} (p. Annex). Table 1 (1993) reports the legacy Educational Attainment value, and Table H (2009) reports the HDI_{2007} value. Table GER reports the combined primary, secondary, and tertiary ratio, or the Gross Enrollment Ratio (HDR, 2009, p. Table GER)

In the Country Briefs section, the GDP data are stated in terms of Purchasing Power Parity (ppp), standardized to the United States dollar in 2000, as this is the methodology used by the HDR. The 2010 Human Development Report provides the demographic and economic data in its statistical database (HDR, 2010f). The United Nations Educational, Scientific, and Cultural Organisation (UNESCO) provide the data on government expenditure on public education (2010). Pre-test Shadow Economy data are calculations for the average Shadow Economy size in the years 1990 – 1998, while the posttest Shadow Economy data are calculations for the average from 1999 through 2008, as consistent with the method used in creating the Shadow Economy data set (Schneider et al., 2010a).

Group #1 - Countries of the former USSR

The Baltics: Estonia, Latvia, Lithuania

Duke Midaugas unified the Baltic tribes from 1236 to 1263 in current-day Lithuania. Grand Duke Gediminas ruled until 1341, and stretched Gediminas Dynasty from the Baltic to the Black Sea, spreading Christianity. By 1864 and until WWI, the Russian Empire had taken control over the Baltics from Austria and Prussia. Lithuania and Latvia declared independence after WWI, and Estonia won independence in 1918 with the Peace Treaty of Tartu. German and Soviet forces occupied each during the interwar years. The German and Soviet non-Aggression Pact of 1939 brought the Baltics into the USSR. During the Cold War, the economies of the Baltic States were reorganized to benefit the Soviet needs into an urbanized industrial workforce building military equipment. With the demise of the Soviet Empire, the Baltic States gained independence again in September 1991 (DOS, 2010, p. Balkans, History).

Estonia

Europa reports that Russian annexation of Estonia from Swedish rule in 1721 established Estonia's geographic boundaries. In 1944, Soviet troops began the Estonian 'Sovietization'." "By the end of 1949, most Estonian farmers had been forced to join collective farms. Investment concentrated on electricity generation and the chemicals sector expanded heavy industry. Structural change in the economy was accompanied by increased political repression…" (Maher, 2008, p. 1585). "Even before it regained independence…, Estonia had begun a transition to a market economy. However, despite Estonia's relative prosperity during the Soviet period, the collapse of the USSR and its internal economic system resulted in serious economic difficulties. The annual rate of inflation reached 1,076% in 1992" (p. 1586). August 20, 1990, marks the re-independence of the Republic of Estonia as a democratic state (CIA, p. Estonia).

In 1990, Estonia's population was 1.57 million, 96.0% of those ages 15 and above were literate. The combined gross enrollment was 81.5%. Of government expenditures, 25.5% were

dedicated to public education. The education index was 2.66. The Life Expectancy index was .740, life expectancy at birth was 69.4 years. The GDP was $5.99 billion, $3,822 per capita, for a GDP index value of .781. The GDP per capita hit its low in 1993, registering $2,744, rebounding by 2001 to exceed levels prior to the USSR breakup. The average annual growth GDP per capita rate from 1989 to 2008 was 8.9%. The HDI in 1990 was .817, and the Shadow Economy equaled 34.3% of the total GDP.

In 2008, the population of Estonia decreased to 1.34 million. On average, 99.8% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 91.2%. The education index was .964; 14.78% of Estonia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .799 with expectancy of 72.9 years. GDP Index was .887, at $9.53 billion and $7,114 per capita. The HDI increased to .883 or 40th in the world. Estonia's estimated underground economy from 1999 to 2008 averaged 40.3%, which translates to $3.8 billion in 2008, bringing the gross GDP to $13.8 billion and GDP per capita, $9,980 per person.

Latvia

According to DOS, Latvia did not enjoy a time of territorial sovereignty prior to November 18, 1918, when the Latvian People's Council declared its independence, which was lost again to the USSR until August 21, 1991 (p. Latvia, History). During the Cold War, Latvia maintained some economic viability as a trade route to the north via the Baltic Sea, and capitalized on its indigenous resources of timber and agriculture products. Latvia embraced free market reforms and transparency since reestablishing its independence (p. Economy). Latvia lost a third of its population to the Holocaust (p. History).

In 1990, Latvia's population was 2.67 million, 96.0% of those ages 15 and above were literate, with a combined gross enrollment of 73.7%. Of government expenditures, 16.79% were dedicated to public education. The education index was 2.66. The Life Expectancy index was

.734 and life expectancy at birth was 69.1 years. Latvia's GDP was $10.41 billion or $3,901 per capita, for a GDP index value of .771. The HDI in 1990 was .803. The HDI in 1990 was .817, and the Shadow Economy equaled 25.7% of the total GDP. The average annual growth of the GDP per capita from 1989 to 2008 was 6.7%. The GDP per capita hit its low in 1993, registering $2,271, and rebounded by 2004 to exceed levels prior to the USSR breakup.

In 2008, the population of Latvia increased to 2.27 million. On average, 99.8% of those ages 15 and above were literate in the years from 1999-2008, with combined gross enrollment of 90.2%. The education index was .961; 22.66% of Latvia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .788 with expectancy of 72.3 years. GDP Index was .851, at $13.67 billion and $6,036 per capita. The HDI increased to .866 or 48th in the world. Latvia's estimated underground economy from 1999 to 2008 averaged 41.7%, which translates to $5.7 billion in 2008, bringing the gross GDP to $19.38 billion and income per capita, $8,553 per person.

Lithuania

According to DOS, Lithuania regained independence on February 4, 1991 from the USSR. The Lithuanians posted the greatest relative population loss to the Holocaust. As a Republic, Lithuania's economic position was manufacturing and trade for the Soviet Union. After the USSR demise, the inefficient infrastructure could not compete with world manufacturing, and Lithuania relied on the former USSR for 90% of its exports. By 1997, only 47% of the exports shipped to the Soviet States, and the market reforms toward private enterprise had begun to work. Lithuania has an ice-free seaport, which ferries goods and traffic to Swedish, Danish, and German ports. As of 2008, Lithuania has strong growth in the technology and service sectors along with a record of democratic voting (p. Lithuania, History).

In 1990, Lithuania's population was 3.7 million, 96.0% of those ages 15 and above were literate, with a combined gross enrollment of 74.6%. Of government expenditures, 21.8% were

dedicated to public education. The education index was 2.66. The Life Expectancy index was .763 and life expectancy at birth was 70.8 years. Lithuania's GDP was $15.866 billion or $4,041 per capita, for a GDP index value of .816. The HDI in 1990 was .828, and the Shadow Economy equaled 26% of the total GDP. The GDP per capita hit its low in 1993, registering $2,435, and rebounded by 2003 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1989 to 2008 was 4.3%.

In 2008, the population of Lithuania decreased to 2.27 million. On average, 99.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 92.3%. The education index was .968; 14.58% of Lithuania's 2000-2008 government expenditure was on education. The Life Expectancy Index was .780 with expectancy of 71.8 years. GDP Index was .863, at $20.25 billion and $5,154 per capita in US 2000 constant dollars. The HDI increased to .870 or 46th in the world. Lithuania's estimated underground economy from 1999 to 2008 averaged 31.9%, which translates to $6.48 billion in 2008, bringing the gross GDP to $26.72 billion and income per capita, $6,798 per person.

Central Asia: Kazakhstan and Turkestan - Tajikistan, Turkmenistan, Kyrgyzstan, and Uzbekistan

The vast area of Turkestan covers the geographic boundaries of Uzbekistan, Turkmenistan, Tajikistan, and Kyrgyzstan, Afghanistan, and Mongolia (Humboldt, 1843). Characterizing the region are nomadic peoples and the Silk Road overland travel route connecting Asia with Europe. The region fell under the rule of Genghis Khan by 1227 and remained occupied by various Mongolian rulers until the Russian Empire took control of all but Mongolia (Elisseeff, 1998). In 1727, Russia and Manchu China concluded the Treaty of Khaiaka detailing the border between China and Mongolia that exits in large part today (Dos, 2010, p. Mongolia). Mongolia and Kazakhstan create over 10,000 kilometers of Russia's southern border. All of Turkestan was under communism after WWI. Mongolia's model for its communist government was the Soviet model. From 1920 until the 1980s, Mongolia aligned itself with the Soviet Union for continued military

assistance against China (p. Mongolia). Since its 1990 independence, Mongolia has shifted toward a market economy, electing non-communist leaders starting in the 1993 elections, and has increased foreign relations with China, the US, and other industrialized nations (p. Mongolia). The Shadow Economy of the Kazakhstan and Turkestan regions grew from 25.88% of the total GDP in 1990 to 40.57% in 2008 (Schneider, 2010, Tables 1-3).

Tajikistan

Tajikistan's geographic boundaries date back to the Samanid Empire (A.D. 875 – 999); however, the Mongol and then Russian Empires honored no boundaries. In 1920, the area came under Soviet rule as part of Uzbekistan. Tajikistan gained autonomy as a Soviet Socialist Republic in 1929. From 1992 through 1997, Tajikistan suffered ongoing civil war, decimating its economic infrastructure, and remains the poorest country of the former Soviet Union. By 2008, the political situation suffered from a lack of transparency, and flawed elections. "Government interference in the economy and massive corruption stifle economic growth and private investment" in Tajikistan (p. Economy).

In 1990, Tajikistan's population was 5.3 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 77.5%. Of government expenditures, 29.3% were dedicated to public education. The education index was 2.25. The Life Expectancy index was .632 and life expectancy at birth was 62.9 years. Tajikistan's GDP was $2.259 billion or $426 per capita, for a GDP index value of .581. The HDI in 1990 was .636, and the Shadow Economy figure was 25.88% of the total GDP. The GDP per capita hit its low in 1996, registering $122, where it remained through 1997. Tajikistan is one of five countries in the sample set with a GDP per capita that, as of the data gathered for 2008, has yet to rebound to levels seen prior to the USSR breakup. Moldova, Kyrgyzstan, the Ukraine, and Serbia are the other countries. The average annual growth rate in GDP per capita from 1989 to 2008 was -2.8%.

In 2008, the population of Tajikistan increased 6.84 million. On average, 99.6% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 70.9%. The education index was .896; 17.1% of Tajikistan's 2000-2008 government expenditure was on education. The Life Expectancy Index was .691 with expectancy of 66.4 years. GDP Index was .474, decreased 26% to $1.67 billion and $245 per capita. The HDI increased to .688 or 127th in the world. Tajikistan's estimated underground economy from 1999 to 2008 averaged 44.3%, which translates to $742 million in 2008, bringing the gross GDP to $2.42 billion and income per capita, a meager $353 per person, the lowest income per person in the sample set.

Turkmenistan

According to DOS, Turkmenistan was the home of the "powerful Turks of the Seljuk Empire" from the middle of the 11th century until it broke down in the late 12th century. The "Turkmen lost their independence when Genghis Khan took control of the eastern Caspian Sea region on his march west" (p. History). Intertribal wars and rule by various empires over the next seven centuries depleted the strength of the Turkmen. As the Russian Empire's strength waned, the Soviet Empire overtook Turkmenistan by 1924 (p. History). Although its economy has promise due to vast natural gas reserves, it is corrupt, and deeply connected to centralized planning. Researchers are unable to quantify the degree of corruption in Turkmenistan. The Red Cross and international organizations maintain a presence in Turkmenistan to thwart ongoing human rights and political violations (p. Political Conditions).

In 1990, Turkmenistan's population was 3.67 million, 93.0% of those ages 15 and above were literate, with no gross enrollment data available. Of government expenditures, 24.5% were dedicated to public education. The Education Index was 2.25. Life Expectancy index was .629; life expectancy at birth was 62.8 years. Turkmenistan's GDP was $3.82 billion or $1,042 per capita, with no GDP index value available. The 1990 HDI for Turkmenistan is .73. The GDP per capita hit its low in 1997, registering $455, and rebounded by 2004 to exceed levels prior to the

USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 2.65%. The HDI in 1990 was .817, and the Shadow Economy equaled 24 % of the total GDP.

In 2008, the population of Turkmenistan increased to 5.4 million. On average, 99.5% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 73.9%. The education index was .906; Turkmenistan's 2000-2008 government expenditure on education averaged 24.5% of total expenditures. The Life Expectancy Index was .661 with expectancy of 64.6 years. GDP Index was .651. GDP rose to 8.64 billion and $1,714 per capita. The HDI was .739 or 109th in the world. Turkmenistan's underground economy estimation was 36%, and the gross GDP estimation was $11.76 billion in US constant year 2000 dollars, which translates to a gross figure of $2,331 Total per capita income.

Uzbekistan

Uzbekistan's geographic boundaries were created by the Soviets in 1924 from the territories of three "leading cities along the Silk Road, Bukhara, Khiva, and Samarkand" (DOS, p. People). This territory is 90% Sunni Muslim and about 80% Uzbek. The economy of Uzbekistan relies on natural resources, cotton for exports, and manufacturing for the Russian market. The 2007 GDP/c is 25% less than 1990 figures. The economic depression is a result of tight governmental control over industry and cronyism (p. Economy). "The constitution of Uzbekistan provides for separation of powers, freedom of speech, and representative government. In reality, the executive holds almost all the power… [and] selects and replaces provincial governors (p. Political Conditions). "None of … [the 1991 – 2008] elections or referenda were deemed free or fair" elections by the Organisation for Security and Co-operation in Europe (OSCE) (p. Political Conditions).

In 1990, Uzbekistan's population was 20.51 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 75.6%. Of government expenditures, 22.84% were dedicated to public education. The education index was 2.25. The Life Expectancy index

146

was .697 and life expectancy at birth was 66.8 years. Uzbekistan's GDP was $14.04 billion or $685 per capita, for a GDP index value of .510. The HDI in 1990 was .687. GDP per capita hit its low in 1996, registering $499, and rebounded in 2006 to exceed levels prior to the USSR breakup, its average annual growth rate from was 1.08%. The Shadow Economy equaled 22.1 % of the total GDP or $3.1 billion in US equivalent dollars in 2000.

In 2008, the population of Uzbekistan increased to 27.31 million. On average, 96.9% of those ages 15 and above were literate in the years from 1999-2008, with combined gross enrollment of 72.7%. The education index was .888; Uzbekistan's 2000-2008 government expenditure on education was 22.84% of total government expenditures. The Life Expectancy Index was .711 with expectancy of 67.6 years. GDP Index was .532, the GDP increased to $22.93 billion; however, and the GDP per person to $840. The HDI increased to .710 or 119th in the world. Uzbekistan's estimated underground economy from 1999 to 2008 averaged 37.93%, which translates to $8.69 billion in 2008, bringing the gross GDP to $37.93 billion and income per capita, $1,158 per person.

Kazakhstan

According to DOS, Kazakhstan provided the coal for the USSR, which moved its industrial sectors closer to Kazakhstan for efficiency. This changed the ethnic makeup of the country when the Kazakhstan Kazakh people (renamed Kyrgyz by the Soviets so they would have the same name as the Kyrgyz people in Kyrgyzstan) became a minority ethnic group to Russians who were displaced to work and oversee coal production. This is the only former Soviet state where the indigenous population became the minority (p. Economy). It is the largest land-locked country in the world, sharing with Russia its northern border, over 6,800 kilometers. As of 2005, the elections did not meet the OSCE standards. The economy is growing and healthy, with energy its leading sector (p. Economy).

In 1990, Kazakhstan's population was 16.35 million, 93.0 % of those ages 15 and above were literate, with a combined gross enrollment of 80.0%. Of government expenditures, 18.88% were dedicated to public education. The education index was 2.25. The Life Expectancy index was .696 and life expectancy at birth was 66.7 years. Kazakhstan's GDP was $26.34 billion or $1,612 per capita, for a GDP index value of .721. The HDI in 1990 was .778.

In 2008, the population of Kazakhstan increased to 37.3 million. On average, 99.6% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 91.4%. The education index was .965; 13.26% of Kazakhstan's 2000-2008 government expenditure was on education. The Life Expectancy Index was .667 with expectancy of 64.9 years. GDP Index was .782, increased an average of 2% to $37.3 billion and $2,380 per capita. The HDI increased to .804 or 82th in the world. Kazakhstan's estimated underground economy from 1999 to 2008 averaged 45.3%, which translates to $16.8 billion in 2008, bringing the gross GDP to $54.2 billion and income per capita, $3,458 per person.

Kyrgyzstan

Kyrgyzstan's geographic boundaries created by the Soviets in 1926 are roughly the borders of the territories inhabited by the Kyrgyz people as of the 16th century (DOS, 2010, p. History). In 1989, Kyrgyzstan citizens voted to remain faithful to the "'renewed federation'" (p. History) of the USSR. In 1990, 89% Kyrgyzstan's exports of went to the USSR, mostly agriculture and coal (p. Economy). Corruption has plagued politics in Kyrgyzstan, with the 2005 election improved but not acceptable by election commission of the OSCE community (p. Government).

In 1990, Kyrgyzstan's population was 4.42 million, 93.0 % of those ages 15 and above were literate, with a combined gross enrollment of 77.5%. Of government expenditures, 23.1% were dedicated to public education. The education index was 2.25. The Life Expectancy index

was .688 and life expectancy at birth was 66.3 years. Kyrgyzstan's GDP was $2.05 billion or $465 per capita, for a GDP index value of .547. The HDI in 1990 was .687.

In 2008, the population of Kyrgyzstan increased to 5.28 million. On average, 99.3% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enroll-ment of 77.3%. The education index was .918; 18.25% of Kyrgyzstan's 2000-2008 government expenditure was on education. The Life Expectancy Index was .710 with expectancy of 67.6 years. GDP Index was .500, decreased an average of 1.07% per year to $2.0 billion and $379 per capita. The HDI increased to .710 or 120th in the world. The estimated underground economy from 1999 to 2008 averaged 42.0%, which translates to $804 million in 2008, bringing the gross GDP to $2.4 billion and income per capita, $538 per person.

Eastern Europe: Belarus, Moldova, Poland, Romania, Russian Federation, and Ukraine

Belarus

Belarus's geographic boundaries today were approximately those created in 1939 with land seized during the Soviet invasion of Poland unified with the Belorussian SSR (Maher, 2004, p. 713). Belarus was "one of the most prosperous in the USSR, with a wider variety of consumer goods available than other republics (p. 713). Belarus was an original member of the USSR in 1922. The following is from DOS (2010c, p. Belerus).

> Occupied by the Russian empire from the end of the 18th century until 1918, Belarus declared its short-lived National Republic on March 25, 1918, only to be forcibly absorbed by the Bolsheviks into what became the Soviet Union…. It declared its sovereignty on July 27, 1990, and independence from the Soviet Un-ion on August 25, 1991, and independence from the Soviet Union on August 25, 1991.

By 1995, Belarus's economy was 61% off 1990 levels, and had recovered by 2000. Bela-rus's economic downturn was due in part to the lack of an independent economic infrastructure and trade lost to neighboring countries with dissolution of the Soviet economic system, and was minimized in part by private market forces as operating successfully as black markets to the communist economy (Maher, 2004). By 2008, elections failed to meet OSCE standards follow-

ing two years of protests for increased energy security and pressure on the government to "meet 12 terms that had been stipulated by the European Commission in November 2006 as being conditional to Belarus's access to greater aid and trade co-operation within the European Neighborhood Policy" (DOS, 2010c, p. Political Conditions).

In 1990, Belarus's population was 10.19 million, 95.0% of those ages 15 and above were literate, with a combined gross enrollment of 80.2%. Government expenditures on education were 17.1% of total government expenditures. The education index was 2.47. The Life Expectancy index was .760 and life expectancy at birth was 70.6 years. Belarus's GDP was $14.36 billion, $1,410 per capita, for a GDP index value of .705. The HDI in 1990 was .795. GDP per capita hit its low in 1995, registering $920, and rebounded in 2002 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 3.09%. The Shadow Economy equaled 35.6% of the total GDP or $5.1 billion in US equivalent dollars in 2000.

In 2008, the population of Belarus decreased to 9.68 million. On average, 99.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 90.4. The education index was .961; 11.263% of Belarus's 2000-2008 government expenditure was on education. The Life Expectancy Index was .733 with expectancy of 69.0 years. GDP Index was .782, increased to 24.34 billion and $2,515 per capita. The HDI increased to .828 or 68th in the world. Belarus's estimated underground economy from 1999 to 2008 averaged 49.8%, which translates to $12.12 billion in 2007, bringing the gross GDP to $36.47 billion and income per capita, $3,767 per person.

Moldova

According to DOS, Moldova's geographic boundaries were created when it gained its independence in 1991. The boundaries are consistent with those formed in 1940 by the USSR and roughly those of Bessarabia since the 13th century Moldova was formerly part of the Mongol and

Ottoman Empires, offering a southern overland passage for the Silk Road (p. History). The GDP in 2007 was 56% of its 1990 height. Moldova is one of the poorest countries in Europe, having lost much of its market for its main export to the USSR, wine. Corruption, state-sponsored media, and ineffective law enforcement plague Moldova, and the elections through 2008 were unacceptable to the Operation for Security and Co-Operation in Europe (OSCE) (p. Government).

In 1990, Moldova's population was 4.36 million, 95.0% of those ages 15 and above were literate, with a combined gross enrollment of 69.9%. Government expenditures on education were 22.9% of total government expenditures. The education index was 2.38. The Life Expectancy index was .709 and life expectancy at birth was 67.6 years. Moldova's GDP was $3.61 billion or $980 per capita, for a GDP index value of .619. The HDI in 1990 was .735. GDP per capita hit its low in 1999, registering $346, and has yet to rebound to exceed levels prior to the USSR breakup.

In 2008, the population of Moldova decreased to 3.63 million. On average, 99.2% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 71.6%. The education index was .899; 20.2% of the 2000-2008 government expenditure was on education. The Life Expectancy Index was .722 with expectancy of 68.3 years. GDP Index was .541; its income per capita fell to $2.11 billion and $591 per capita, one of the worst performing economies coming out of the former USSR. The HDI decreased to .720 or 117th in the world. The estimated underground economy from 1999 to 2008 averaged 45.8%, which translates to $967 million in 2008, bringing the gross GDP to $3.08 billion and income per capita, $862 per person, an average annual growth of 2.6%.

Poland

Poland was reconstructed in 1918, during the Treaty of Versailles, to roughly the boundaries of the laid out by King Mieszko I in 966. Poland united with Lithuania and together occupied the geography of today's Baltic region, Ukraine, Belarus, and parts of Russia until 1795.

Poland was partitioned between Austria, Prussia, and Russia from 1795 to 1918. From 1918 to 1939, Poland was independent, but was split between Germany and USSR in 1939, as a result of the Molotov–Ribbentrop Pact, the non-aggression pact between the Soviet Union and Germany following WWII. From 1945 to 1989, Poland was part of the Soviet Empire. In 2007, 98% of Poland's population ethnically Polish (DOS, 2010, p. History). Poland's economy is healthy, diverse, and growing, and as of 1996, its election processes pass the OCSE standards (p. Economy).

In 1990, Poland's population was 38.12 million, 96% of those ages 15 and above were literate, with a combined gross enrollment of 75.5%. Government expenditures on education were 12.2% of total government expenditures. The education index was 2.57. The Life Expectancy index was .769 and life expectancy at birth was 71.1 years. The GDP was $118 billion or $3,097 per capita, for a GDP index value of .738. The HDI in 1990 was .806. The GDP per capita low was in 1992, at $2,936, and rebounded in 1994 to exceed levels prior to the USSR breakup.

In 2008, the population of Poland increased slightly to 38.2 million. The loss of roughly two million ethnic Poles to the holocaust partly offset population. On average, 99.3% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 87.7. The education index was .952; 12.12% of Poland's 2000-2008 government expenditure was on education. The Life Expectancy Index was .842 with expectancy of 75.5 years. GDP Index was .847; the GDP was $237 million and $6,228. The HDI increased to .880 or 41st in the world. Poland's estimated underground economy from 1999 to 2008 averaged 28%, which translates to $66 billion in 2008, bringing the gross GDP to $303 billion and income per capita, $7,972 per person, an average annual increase of 3.7%.

Romania

According to DOS, the Treaty of Berlin created Romania's geographic boundaries in 1881. Today, 89% of its population are ethnic Romanians and affiliate themselves with the Romanian Orthodox church (p. People). "Romania's 1991 constitution proclaims Romania a

democracy and market economy," and claims as some of its values, human dignity, civil rights and freedoms, and justice (p. Government).

In 1990, Romania's population was 23.21 million, 95.0% of those ages 15 and above were literate, with a combined gross enrollment of 66.4%. Government expenditures on education were 13.6% of total government expenditures. The education index was 2.47. The Life Expectancy index was .740 and life expectancy at birth was 69.4years. Romania's GDP was $43.98 billion or $1,896 per capita, for a GDP index value of .752. The HDI in 1990 was .786. GDP per capita hit its low in 1992, registering $1,553, and rebounded in 2004 to exceed levels prior to the USSR breakup.

In 2008, the population of Romania decreased to 21.51 million. On average, 97.6% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 79.2. The education index was .915; 11.55% of Romania's 2000-2008 government expenditure was on education. The Life Expectancy Index was .792 with expectancy of 72.5 years. GDP Index was .804, growing to $61.19 billion and $2,845 per capita, an annual average increase of 2.1%. The HDI increased to .837 or 63rd in the world. Romania's estimated underground economy from 1999 to 2008 averaged 36.3%, which translates to $22.2 billion in 2008, bringing the gross GDP to $83.41 billion and income per capita, $3,877 per person.

Russian Federation

According to the DOS, as of 2007, Russia's 139.4 million citizens descend from more than 100 ethnic groups speaking six languages and many dialects (p. People). Russia continues to reform its government into a modern system with "a president who wields considerable executive power…no vice president, and the legislative branch is far weaker than the executive" (p. Government). From 1994 through 2008, Russian forces fought two wars and many skirmishes with the Chechens, for the territory of Chechnya, which threatened to recede along with the rest of the Caucasian states (p. Russian Federation). This geographic area was of interest to the new Russian

Federation for its vast oil reserves. Chechnya, having not been a separate state of the USSR, did not qualify for separate nation status under the new Soviet constitution (p. Russian Federation). The market reforms toward a freer market system in the wake of the demise of the USSR have not taken hold. Tight control over industry, corruption, and high tariffs helped cause several years of hyperinflation. Recent increases in oil revenues after a tax collection overhaul have solidified the economy on surer ground (p. Economy).

In 1990, Russia's population was 148.29 million, 94% of those ages 15 and above were literate, with a combined gross enrollment of 83.7%. The education index was 2.61. The Life Expectancy index was .714 and life expectancy at birth was 67.9 years. Russia's GDP was $385.9 billion or $2,602 per capita, for a GDP index value of .817. The HDI in 1990 was .821, and the Shadow Economy equaled 27.8% of the total GDP. The GDP per capita hit its low in 1998, registering $1,511, and rebounded by 2007 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was .083%.

In 2008, the population of Russia decreased to 141.95 million. On average, 99.5% of those ages 15 and above were literate from 1999-2007, with combined gross enrollment of 81.9. The Education Index was .933; 11.6% of Russia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .686 with expectancy of 66.2 years. GDP Index was .833, with GDP at $432 billion and $2,602 per person. The HDI decreased to .817 or 71st in the world. Russia's estimated underground economy from 1999-2008 averaged 48.6%, translating to $209 billion in 2008, bringing the gross GDP to $641 billion and income per capita, $4,523 per person.

Ukraine

Ukraine's geographic boundaries created by the Treaty of Pereiaslav in 1654 are now the same, after the 1939 reunification of Galicia-Volhynia, and the 1954 of transfer of Crimea from the USSR back to Ukraine. It was one of the founding republics of the Soviet Union in 1922.

From 1961 through 1989, Ukraine produced about 25% of the total agricultural output of the USSR, and lead Europe in technology research, and industrial and steel manufacturing for the arms, mining and transportation industries. The population is over 75% ethnic Ukrainian. Many of the Soviet officials came from the Ukraine, including Leonid Brezhnev, leader of the Soviet party from 1964 – 1982, and the ruling clans remain powerful (USAID, 2006; CIA, 2009a). The Chernobyl Nuclear Power Plant explosion in 1986 marked the start of a deep economic trough. Ukraine's Act of Independence, on August 24, 1991 by a then newly elected parliament, marked the start of Ukraine as a democratic state. By 1999, Ukraine's economy shrunk to about 40% of its 1990 levels, due in part to the economic infrastructure and trade lost to neighboring countries and the dissolution of the Soviet economic system, and due in part to corruption's unwillingness to embrace a transparent, market-based system. By 2008, the political process had begun to stabilize, after public scrutiny for election fraud and corruption leading up to the 2004 elections (CIA,2009a).

In 1990, Ukraine's population was 51.89 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 77.9%. Government expenditures on education were 24.35% of total government expenditures. The education index was 2.30. The Life Expectancy index was .745 and life expectancy at birth was 69.7 years. Ukraine's GDP was $71.95 billion or $1,387 per capita, for a GDP index value of .742. The HDI in 1990 was .754, and the Shadow Economy equaled 29.4 % of the total GDP. The GDP per capita hit its low in 1998, $590, and has not yet rebounded to its levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was -.095%.

In 2008, the population of Ukraine decreased to 46.26 million. On average, 99.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 90. The education index was .960; 53.9% of Ukraine's 2000-2008 government expenditure was on education. The Life Expectancy Index was .720 with expectancy of 68.2

years. GDP Index was .707; the GDP was $53.46 billion and $1,156 per capita. The HDI increased to .796 or 85th in the world. Ukraine's estimated underground economy from 1999 to 2008 averaged 53.9%, which translates to $28.8 billion in 2008, bringing the gross GDP to $82 billion and income per capita, $1,794 per person.

Transcaucasia: Armenia, Azerbaijan, and Georgia

Armenia

According to DOS, the Republic of Armenia's geographic boundaries today are those created in 1828 by the Russian Empire. Armenia signed its original Declaration of Independence from the Ottoman Turks on May 28, 1918. In 1920, the Soviet Red Army declared Armenia a Soviet Republic. Armenia reclaimed her sovereignty from the USSR on August 23, 1990. Industry accounted for seventy percent of Armenia's Soviet-run economy, as the second most densely populated region provided the needed labor, leaving relatively few acres available for agricultural production; only twenty percent of 1989 GDP was due to agricultural production. By 1993, Armenia's economy was 40% off 1989 levels, due in part to the trade lost to neighboring countries with dissolution of the Soviet economic system, the lack of a self-sufficiency due to reliance on imports for food and exports for GDP, and, being land-locked, reliance on relationships with neighboring countries for trade and travel. Azerbaijani and Turkish forces blocked rail traffic in 1992, nearly bringing its economy to a standstill. The economy still struggles with corruption's unwillingness to embrace a transparent, market-based system (p. Economy). Through 2008, the political process remained unstable after public scrutiny for election fraud and corruption leading up to the early 2008 elections (p. Armenia).

In 1990, Armenia's population was 3.54 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 74.1%. Government expenditures on education were 20.50% of total government expenditures. The education index was 2.25. The Life Expectancy index was .715 and life expectancy at birth was 67.9 years. Armenia's GDP was $2.8

billion or $709 per capita, for a GDP index value of .574. The HDI in 1990 was .731, and the Shadow Economy equaled 40.3% of the total GDP. The GDP per capita hit its low in 1992, registering $392, and rebounded by 2002 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 3.2%.

By 2008, the population of Armenia decreased by 440,000 to 3.08 million. On average, 99.5% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 74.6. The education index was .909; 13.2% of Armenia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .810 with expectancy of 73.6 years. GDP Index was .675, increased to $4.67 billion and $1,299 per capita. The HDI increased to .798 or 84th in the world. Armenia's estimated underground economy from 1999 to 2008 averaged 48.7%, which translates to $2.27 billion in 2008, bringing the gross GDP to $7.82 billion and income per capita, $2,487 per person.

Azerbaijan

According to documents at the DOS, the Russian Empire created Azerbaijan Democratic Republic's geographic boundaries in 1828. Like Armenia, Azerbaijan signed its original Declaration of Independence from the Ottoman Turks on May 28, 1918; in 1920, the Soviet Red Army declared Azerbaijan a Soviet Republic. Azerbaijan reclaimed her sovereignty from the USSR on August 30, 1990. Unlike many former Soviet states, Azerbaijan is economically viable, possessing two important advantages: vast oil reserves, and a coastline on the Caspian Sea. Azerbaijan's economy was in turmoil through the 1990s due in part to the lack of an independent economic infrastructure and trade lost to neighboring countries following the dissolution of the Soviet economic system. As a Soviet Republic, it provided mostly agricultural products to the USSR to the detriment strengthening its industrial sector. Heavy industries are state-owned and planned by Azerbaijan's central government. The transition into an oil exporting country exacerbated the turmoil and hyperinflation accompanied the rapid expansion into the oil industry. By

2008, the elections largely conformed to the Organization for Security and Cooperation in Europe (OSCE) standards (p. Azerbaijan).

In 1990, Azerbaijan's population was 7.16 million, 93% of those ages 15 and above were literate, with a combined gross enrollment of 72.1%. Government expenditures on education were 26.6% of total government expenditures. The education index was 2.25. The Life Expectancy index was .677 and life expectancy at birth was 65.6 years. Azerbaijan's GDP was $3.21 billion or $978 per capita, for a GDP index value of .654. The HDI in 1990 was .755, and the Shadow Economy equaled 36.3% of the total GDP. The GDP per capita hit its low in 1995, registering $488, and rebounded by 2006 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 2.8%.

By 2008, the population of Azerbaijan grew to 8.68 million. On average, 99.5% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 66.2. The education index was .881; 18.52% of Azerbaijan's 2000-2008 government expenditure was on education. The Life Expectancy Index was .751 with expectancy of 70 years. GDP Index was .728, GDP increased to $5.73 billion and $1,825 per person. The HDI increased to .787 or 86th in the world. Azerbaijan's estimated underground economy from 1999 to 2008 averaged 63.3%, which translates to $11.7 billion in 2008, bringing the gross GDP to $30.21 billion and income per capita, $3,840 per person.

Georgia

Georgia's geographic boundaries were created "on May 26, 1918, in the wake of the Russian Revolution" (DOS, 2010, p. History). After 2,200 years of occupation and shifting empires, the population remains cohesive with over 82% of its population being ethnic South Caucasians and Georgian Orthodox (p. History). From 1961 through 1989, Georgia was one of the most prosperous states of the USSR. "Political turmoil following Georgia's independence had a catastrophic effect of the country's economy. The cumulative decline in real GDP is estimated to

158

have been more than 70% between 1990 and 1994" (p. Economy). Georgia exported 100% of some fruits and vegetables to the USSR until 1990. Turkey is now its biggest trading partner. Georgia has the highest rate of Shadow Economy in the world, at 68%, with a government "marked by rampant cronyism, corruption, and mismanagement" (p. Economy). New reforms and a flat tax structure increased tax collection from 17.8% in 2004 to 22.2% in 2008.

In 1990, Georgia's population was 5.46 million, 93% of those ages 15 and above were literate, with a combined gross enrollment of 78.3%. Government expenditures on education were 6.9% of total government expenditures. The education index was 2.25. The Life Expectancy index was .759 and life expectancy at birth was 70.5 years. Georgia's GDP was $8.15 billion or $1,572 per capita, for a GDP index value of .675. The HDI in 1990 was .739, and the Shadow Economy equaled 45.1% of the total GDP. The GDP per capita hit its low in 1994, registering $458, and as of the 2008 data collection, had yet to rebound to meet levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was -.012%.

In 2008, the population of Georgia decreased to 4.31 million. On average, 99.0% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 76.7%. The education index was .916; 10.11% of Georgia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .777 with expectancy of 71.6 years. GDP Index was .641, GDP decreased to $5.47 billion and $1,249 per capita. The HDI increased to .778 or 89th in the world. Georgia's estimated underground economy from 1999 to 2008 is the highest in the world, averaging 68.8%, which translates to $3.76 billion in 2008, bringing the gross GDP to $9.24 billion and income per capita, $2,108 per person.

Group #2 - Non-USSR Soviet Influenced States

Bulgaria

Bulgaria first won its independence in 1908. Bulgaria sided with the Axis powers during World War II and "communism emerged as the dominant political force" in 1944 (DOS, 2010, p. History). Due to the "loss of the Soviet market…, the standard of living fell by about 40%. [By] October 2002, the European Commission declared Bulgaria had a 'Functioning Market Economy'" (p. Economy).

In 1990, Bulgaria's population was 8.72 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 72.6%. Government expenditures on education were 8.54%. The education index was 2.42. The Life Expectancy index was .770 and life expectancy at birth was 71.2 years. Bulgaria's GDP was $14.56 billion or $1,671 per capita, for a GDP index value of .732. The HDI in 1990 was .803. GDP per capita hit its low in 1997, registering $1,373, and rebounded in 2003 to exceed levels prior to the USSR breakup.

By 2008, the population of Bulgaria fell to 7.62 million. On average, 98.3% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 82.4. The education index was .930; 9.26% of Bulgaria's 2000-2008 government expenditure was on education. The Life Expectancy Index was .802 with expectancy of 73.1 years. GDP Index was .788, with GDP at $20.28 billion and $2,661 per capita. The HDI increased to .788 or 61st in the world. Bulgaria's estimated underground economy from 1999 to 2007 averaged 37.5%, which translates to $7.6 billion in 2007, bringing the gross GDP to $27.9 billion and income per capita, $3,659 per person, an annual average of 2.4%.

Germany

According to DOS, the area around today's Germany was, until 1871, "Europe's German-speaking territories…divided into hundreds of kingdoms, principalities, duchies, bishoprics, fiefdoms and independent cities and towns. In 962, the territories were part of the Holy Roman

Empire until the Congress of Vienna in 1815, which created the German Confederation made up of 38 independent states. The German Empire began in 1871, because of the Franco-Prussian war, and ended with the Treaty of Versailles in 1919, with the loss of the Alsace territory to France. After World War II, Germany's western border was re-drawn partitioning traditionally Slavic territory to Poland in 1945. Soviet forces maintained its occupation including the western part of Germany starting from West Berlin (p. History).

During the 1950s, East German citizens fled to the West by the millions. The Soviets made the internal German border increasingly tight… [and on] August 13, 1961…began building a wall through the center of Berlin, slowing down the flood of refugees and dividing the city" (p. History). As the Soviet Union began to dissolve in 1989, "a growing flood of East Germans began to take advantage of" the end of border restrictions in Austria and Hungary. On November 9, 1989, the wall was open to free travel (p. History). The economy in Germany increased by 126% from 1990 to 2007 yet remains plagued by high unemployment and high infrastructure costs in the western region (p. Economy).

Germany's population was 79.43 million in 1990, with very high literacy 99%, and combined gross enrollment of 75.8%. Government expenditures on education were 9.2% of total government expenditures. The education index was 2.90. The Life Expectancy index was .842 and life expectancy at birth was 75.5years. Germany's GDP was $1.543 billion or $19,428 per capita, for a GDP index value of .932. The HDI in 1990 was .896. GDP per capita hit its low in 1993, registering $20,268, and rebounded in 1994 to exceed levels prior to the USSR breakup.

In 2008, the population of Germany increased to 82.1 million. On average, 99% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 88.1%. The education index was .954; 10.1% of Germany's 2000-2008 government expenditure was on education. The Life Expectancy Index was .913 with expectancy of 79.8 years. GDP Index was .975, and increased to $2.097 billion and $25,547 per capita. The HDI increased to .947

or 22nd in the world. Germany's estimated underground economy from 1999 to 2008 averaged 16.1%, which translates to $337 billion in 2008, bringing the gross GDP to $2.435 billion and income per capita, $29,660 per person.

Former Czechoslovakia: Czech Republic, Slovakia

According to DOS, the Czech and Slovak ethnic groups from the Hungarian Empire together are considered the largest ethnic group in Southeastern Europe, and were identified by their religious affiliations, where up to 69% of whom where Roman Catholic depending on the area. Forty percent were atheist. The Jewish population was 120,000 in 1948. In 1989, 3,000 Jews remained, the balance lost to concentration camps (p. People). The Slovaks came from the Great Moravian Empire, while the Czechs came from the Hapsburg Empire becoming one country, Czechoslovakia, on October 28, 1918. Despite the ethnic and cultural differences, world leaders kept the two states together in the Pittsburg Agreement, in May 1918, signed by Czechoslovakian Prime Minister Thomas Masaryk, in an attempt to bridge the educational and economic inequality between the two regions. Josip Broz Tito, a Catholic Priest, lead the church and its people to become a Nazi Puppet State (p. Slovak, History). Communism, by Tito's lead, entered Czechoslovakia through the medium of the Catholic Church. The Communist Party took over the country by force in February 1948. "The next four decades, communist ruled under Alexander Dubcek" (p. History). Dubcek was removed due to a sluggish economy, under the Warsaw Pact, in 1968 (p. Economy), however, it remained stagnate through the 1980s. The Velvet Revolution, protesting 250 human rights violations by the government, started the demise of the communist strong hold, which ended December 1989 (p. History). The two countries, led by Klaus for the Czechs and Merciar for the Slovak people, formally separated in 1993.

Czech Republic

According to Europa, the Republic of Czechoslovakia's geographic boundaries were created in October 1918 out of the Czech lands of the Austrian Empire and Slovakia, from the

Hungarian Empire. The two were again split on December 16, 1992 into separate sovereign nations. Czech Republic "aligned itself with the Soviet-led Eastern European bloc, joining the Council for Mutual Economic Assistance (CMEA) and the Warsaw Pact. [The g]overnment followed a rigid Stalinist pattern" (p. 3775). Economic recovery began in January of 1991, with large influx of funds from the IMF. By 1995, the economy was 96% off 1990 levels, due in part to the economic downturn in neighboring countries with dissolution of the Soviet economic system. Through 2008, the political situation remained consistent, with democratic elections in a market economic system (p. 3775). The Check Republic's Shadow Economy is 19.8.

In 1990, Czech Republic's population was 10.36 million, 97.0% of those ages 15 and above were literate, with a combined gross enrollment of 71.7%. Of government expenditures, 16.9% were dedicated to public education. The education index was 2.68. The Life Expectancy index was .785, and life expectancy at birth was 72.1 years. Czech Republic's GDP was $55.29 billion or $5,336 per capita, for a GDP index value of .859. The HDI in 1990 was .847, and the Shadow Economy equaled 13.1% of the total GDP. The GDP per capita hit its low in 1993, registering $4,710, and rebounded by 2000 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 2.2%.

In 2008, the population of Czech Republic increased slightly to 10.42 million. On average, 99.0% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 83.4%. The education index was .938; 9.77% of Czech Republic's 2000-2008 government expenditure was on education. The Life Expectancy Index was .856 with expectancy of 76.4 years. GDP Index was .916, at $79.15 billion and $5,336 per capita. The HDI increased to .903 or 36th in the world. Czech Republic's estimated underground economy from 1999 to 2008 averaged 19.8%, which translates to $15.67 billion in 2008, bringing the gross GDP up to $94.83 billion, or $9,097 per person.

Slovakia

According to DOS, Slovakia is still economically challenged due in part to the depend-ence on exports of oil to the USSR during the Cold War at the expense of developing a diversified economy and world trading partners. Yugoslavia is surrounded on three sides by four Soviet states. Slovakia's wartime dependence on oil exports with the former USSR left little in-frastructure on which its economy could grow. During "1994 through 1998 period, due to the Crony Capitalism under Prime Minister Merciar, the economy struggled…with high government spending and borrowing" (p. Slovakia, Economy). In 2008, Slovakia depended on the EU for 85% of its exports, with little infrastructure for sustainable economic (p. Economy).

In 1990, Slovakia's population was 5.28 million, 97.0% of those ages 15 and above were literate, with a combined gross enrollment of 71.7%. Of government expenditures, 16.9% were dedicated to public education. The education index was 2.72. The Life Expectancy index was .776, and life expectancy at birth was 71.6 years. Slovakia's GDP was $27.52 billion or $5,211 per capita, for a GDP index value of .811. The HDI in 1990 was .827, and the Shadow Economy equaled 15.1% of the total GDP. The GDP per capita hit its low in 1993, registering $3,967, and rebounded by 2001 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1989 to 2008 was 6.4%.

In 2008, the population of Slovakia increased slightly to 5.41 million. On average, 99.0% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 80.5%. The education index was .928; 11.5% of Slovakia's 2000-2008 gov-ernment expenditure was on education. The Life Expectancy Index was .827 with expectancy of 74.6 years. GDP Index was .885, at $46.45 billion and $8,591 per capita. The HDI increased to .880 or 42nd in the world. Slovakia's estimated underground economy from 1999 to 2008 aver-aged 19.7%, which translates to $9.1 billion in 2008, bringing the gross GDP to $55.6 billion and income per capita, $10,284 per person.

The Balkans: Albania, Former Yugoslavia, and Hungary

The Balkan countries that make up the southernmost peninsula in central Europe, include former Yugoslavia, Albania, Turkey, Cyprus, and Greece. Nine countries (as of 2007) have coastlines on this peninsula, used for trade and travel routes to most of Europe and Eurasia including the Soviet Empire. The nine countries are Croatia, Bosnia and Herzegovina, Slovenia, Albania, Greece, Turkey, Cyprus, Bulgaria, and Montenegro (Elisseeff, 1998). Part of the Mongol Empire until overtaken in the late 1300s by the Ottoman Empire that ruled until 1923, the countries in this region were influenced by the Soviet Empire, contiguous with the Soviet Empire, and were under communist rule during a portion of the period from the beginning from WWI to 1990. Albania was the only Balkan country to be absorbed by the USSR (DOS, 2010, p. Balkans). Sachs & Warner (1995a, p. 5) include this region as Socialistic in a study economic policy.

Albania

According to the DOS, the Republic of Albania's geographic boundaries today, are those created in 1385 by the Ottoman Empire and confirmed in 1912 in the Vlore Proclamation declaring its independence. Albania maintained a "strict Stalinist philosophy" (p. Albania) through occupations by Italy and Germany during WWII, and withdrew from the Warsaw Pact in 1968 to isolate itself further from trade dependence on progressive nations (p. Albania). Albania "was the last of the Central and Eastern European Countries to embark on democratic and free market reforms" (p. Albania) resulting in positive economic growth by the late 1990s. The economy still struggles with a negative trade balance, about 4:1; its economic health depends on tourism flows from neighboring countries and the economic health of the EU, its major trading partner, which purchases 79.2% of Albania's exports (p. Economy). In 2003, the opposing political parties entered into a joint pledge for democratic elections and economic reforms. According to the OCSE,

the 2003 and 2005 elections were improved over past elections, yet subject to voting and campaign fraud (p. Albania).

In 1990, Albania's population was 3.29 million, 85% of those ages 15 and above were literate, with a combined gross enrollment of 68.8%. Of government expenditures, 10.87% were dedicated to public education. The education index was 2.41. The Life Expectancy index was .782, and life expectancy at birth was 71.9 years. Albania's GDP was $3.21 billion or $978 per capita, for a GDP index value of .620. The HDI in 1990 was .784, and the Shadow Economy equaled 31% of the total GDP. The GDP per capita hit its low in 1992, registering $644, and rebounded by 1999 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 3.34%.

In 2008, the population of Albania shrank to 3.14 million. On average, 99.0% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment ratio of 67.8%. The education index was .886; 8.43% of Albania's 2000-2008 government expenditure was on education. The Life Expectancy Index was .858 with expectancy of 76.5 years. GDP Index was .710, at $5.73 Billion and $987 per person. The HDI increased to .818 or 70th in the world. Albania's estimated underground economy from 1999 to 2008 averaged 36.3%, which translates to $2.1 billion in 2008, or $7.82 billion and Income per capita, $1,825.

Former Yugoslavia

The Yugoslavia Country Brief (DOS, 2010) reports the following on the People and Political Highlights page. The Ottoman and Hapsburg Empires ruled over the geographic region of today's Yugoslavia until 1878, "when the Congress of Berlin transferred administrative control to Austria-Hungary" (p. Political Highlights). The Treaty of Versailles granted the Kingdom of Yugoslavia sovereignty, until the Axis powers occupied the region through WWII. "The end of the war saw the establishment of a Communist, federal Yugoslavia under the wartime leader, Josip Broz Tito…[creating] six republics within the Yugoslav federation" (p. Political Highlights). "In

1948, after Tito made several foreign policy decisions without consulting Moscow, Yugoslavia was expelled from the Soviet Bloc (p. Serbia)….Despite the appearance of a federal system of government in Yugoslavia, Serbian communists ruled Yugoslavia's political life for four decades" (p. Serbia). Yugoslavia's internal conflicts since the late 1980's have cost the region in terms of economic growth, and the 1999 NATO bombings further devastated its economic infrastructure (p. Economy). Yugoslavia lies between the Adriatic Sea and three former Soviet states, Hungary, Romania, and Bulgaria. Five Yugoslav republics have coastlines on the Adriatic controlling trade traffic from the east to the USSR (p. Economy). Disaggregated data on the percentage of government expenditures dedicated to education were not available for Yugoslavia.

Bosnia and Herzegovina

According to DOS, after the demise of the Soviet Empire, "Bosnia's parliament declared the republic's independence on April 5, 1992….Bosnia and Herzegovina remains one of the poorer countries in Europe" (p. Economy). Through 1995, the war turned into internal conflict between ethnic groups, damaged or destroyed much of the economic infrastructure killing thousands (p. Economy). EU troops remained deployed there through 2008, to aid progress toward transparency in politics and banking (p. History).

In 1990, Bosnia and Herzegovina's population was 4.31 million, 92.7% of those ages 15 and above were literate, with a combined gross enrollment of 65.8%. The education index was 2.34. The Life Expectancy index was .696, and life expectancy at birth was 66.7 years. Bosnia and Herzegovina's GDP was $14.7 billion or $1,445 per capita, for a GDP index value of .753. The HDI in 1990 was .803, and the Shadow Economy equaled 28% of the total GDP. The GDP per capita hit its low in 1993, registering $388, and rebounded by 1994 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1993 to 2008 was .94%.

In 2008, the population decreased to 3.77 million. On average, 96.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 69.0%. The education index was .874; 15.60 % of Bosnia and Herzegovina's 2000-2008 government expenditure was on education. The Life Expectancy Index was .834 with expectancy of 75.1 years. GDP Index was .726, at $8.38 billion and $2,162 per capita. The HDI increased to .812 or 76th in the world. The estimated underground economy, from 1999 to 2008, averaged 34.6%, which translates to $2.9 billion in 2008, bringing the gross GDP to $11.29 billion and income per capita, $2,910 per person.

Serbia

According to the DOS, Serbia, with its current geographic boundaries, became a principality under Russian protection in 1829, and gained its first independence in 1878 at the Congress of Berlin. The communist party invaded Yugoslavia in 1941, under the direction of Josip Broz Tito, creating a satellite state for the party and a strong economy, able to remain sovereign during the Cold War year. During the communist years, the Serbian region was a regional military and economic power. Serbia maintained its continuity with Montenegro as one state until October 2006, with a peaceful split of the traditional geographic regions (p. Serbia).

In 1990, Serbia's population was 7.59 million, 92.3% of those ages 15 and above were literate, with a combined gross enrollment of 65.8%. The education index was 2.34. The Life Expectancy index was .776, and life expectancy at birth was 71.6 years. Serbia's GDP was $10.95 billion or $1,445 per capita, for a GDP index value of .814. The HDI in 1990 was .797. The Shadow Economy equaled 23.6% of the total GDP. The GDP per capita hit its low in 1993, registering $650, and has not rebounded to levels prior to the USSR breakup as of the 2008 data-reporting period. The average annual growth rate in GDP per capita from 1990 to 2008 was -.007%.

In 2008, the population of Serbia increased to 9.15 million. From 1999-2007, 96.4% of those ages 15 and above were literate, with combined gross enrollment of 74.5%. The education index was .891; 11.09% of Serbia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .816 with expectancy of 73.9 years. GDP Index was .773, at $1.19 billion and $1,262 per capita. The HDI increased to .826 or 67th in the world. Serbia's estimated underground economy from 1999 to 2008 averaged 39.67%, which translates to $1.19 billion in 2008, bringing the gross GDP to $4.19 billion and income per capita, $1,763 per person.

Montenegro

Montenegro gained its independence as a principality at the Congress of Berlin in 1878. Montenegro was unified with Serbia while being occupied by Austrian forces until WWI. Montenegro gained its independence from Serbia on June 3, 2006. The elections of 2006 were "generally in line with international standards" (DOS, 2010, p. Montenegro). With coastline on the Adriatic, agricultural trade and tourism have become primary economic industries (p. Montenegro).

In 1990, Montenegro's population was 590,000, 92.3% of those ages 15 and above was literate, with a combined gross enrollment of 65.8%. The Education Index was 2.34. The Life Expectancy index was .843, and life expectancy at birth was 75.6 years. Montenegro's GDP was $848 thousand or $1,445 per capita combined with Serbia, for a GDP index value of .753. The HDI in 1990 was .815, and the Shadow Economy equaled 23.6% of the total GDP. The GDP per capita hit its low in 1999, registering $1,449, as a sovereign nation, rebounding by 2003 to exceed levels prior to the USSR breakup. The GDP per capita average annual growth rate from 1997 to 2008 was 2.1%.

In 2008, the population of Montenegro grew to 620 thousand. On average, 96.4% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 74.5%. The education index was .891; 9.33% of Montenegro's 2000-2008 government

expenditure was on education. The Life Expectancy Index was .817 with expectancy of 74 years.

GDP Index was .795, at $1.45 billion and $2,335 per capita. The HDI increased to .834 or 65th

in the world. Montenegro's estimated underground economy from 1999 to 2008 averaged

39.67%, which translates to $570 thousand in 2008, bringing the gross GDP to $2.03 billion and

income per capita, $3,261 per person.

Croatia

In 1868, the Archduke of Hungary assumed control over Croatia, to protect it from Turk-

ish control. Croatia enjoyed domestic autonomy until the end of WWI, when it joined the

Kingdom of Yugoslavia. Internal conflicts from 1990 through 1999 cost Croatia heavily in the

industrial sectors and crushed its tourism industry. The 1999 bombings by NATO forces further

destroyed infrastructure and trade throughout Yugoslavia. Its GDP in 1993 was only 60% of its

1989 level. The economic rebound was slow, due to "corruption, cronyism, and general lack of

transparency…" (DOS, 2010, p. Economy).

In 1990, Croatia's population was 4.78 million, 92.7% of those ages 15 and above were

literate, with a combined gross enrollment of 65.3%. The education index was 2.34. The Life

Expectancy index was .782, and life expectancy at birth was 71.9 years. Croatia's GDP was

$25.1 billion or $5,285 per capita, for a GDP index value of .805. The HDI in 1990 was .817,

and the Shadow Economy equaled 24.6% of the total GDP. The GDP per capita hit its low in

1993, registering $3,469 and rebounded by 2002 to exceed levels prior to the USSR breakup.

The average annual growth rate in GDP per capita from 1990 to 2008 was 1.3%.

In 2008, the population of Croatia decreased slightly to 4.43 million. On average, 98.7%

of those ages 15 and above were literate in the years from 1999-2007, with combined gross en-

rollment of 77.2%. The education index was .916; 34.7% of Croatia's 2000-2008 government

expenditure was on education. The Life Expectancy Index was .850 with expectancy of 76 years.

GDP Index was .847, at $30.18 billion, the per capita figure to $6,707. The HDI increased to

.871 or 45th in the world. Croatia's estimated underground economy from 1999 to 2008 aver-aged 34.7%, which translates to $10.47 billion in 2008, bringing the gross GDP to $40.65 billion and income per capita, $9,168 per person.

Macedonia

The Treaty of Versailles laid out the geographic area of Macedonia, which partitioned parts of the country off to Bulgaria and Greece. Its constitution as an independent country took effect November 20, 1991. By 2008, Macedonia had met the criteria for membership to NATO. The economy is plagued with dated industrial infrastructure, and out-migration of the skilled la-bor. Civil war between ethnic Albanians in 2001 slowed economic progress (DOS, 2010, p. Macedonia).

In 1990, Macedonia's population was 1.91 million, 92.7% of those ages 15 and above were literate, with a combined gross enrollment of 65.8%. The education index was 2.34. The Life Expectancy index was .773, and life expectancy at birth was 71.4 years. Macedonia's GDP was $3.93 billion or $1,919 per capita, for a GDP index value of .753. The HDI in 1990 was .782, and the Shadow Economy equaled 35.6 % of the total GDP. The GDP per capita hit its low in 1994, registering $1,578, and rebounded by 2006 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was .062%.

In 2008, the population of Macedonia was 2.04 million. On average, 97% of those ages 15 and above were literate from 1999-2007, with combined gross enrollment of 70.1%. The edu-cation index was .880; 15.16% of Macedonia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .819 with expectancy of 74.1 years. GDP Index was .753, at $4.43 billion and $2,158 per capita. The HDI increased to .817 or 72nd in the world. Macedonia's estimated underground economy from 1999 to 2008 averaged 36.2%, which trans-lates to $1.6 billion in 2008, bringing the gross GDP to $6.5 billion and income per capita, $2,940 per person.

Slovenia

According to DOS, part of the Hapsburg Empire until 1918, Slovenia joined other Slavic states to form Yugoslavia in 1929. Axis powers Hungary, Italy, and Germany occupied the area until Tito came into power after WWII ended. Under his rule, "Slovenia became Yugoslavia's most prosperous republic," and after his death, embraced political openness and democracy "unprecedented in the communist world" (p. History)

In 1990, Slovenia's population was 1.99 million, 92.7% of those ages 15 and above were literate, with a combined gross enrollment of 72.7%. The education index was 2.34. The Life Expectancy index was .801, and life expectancy at birth was 73.1 years. Slovenia's GDP was $16.61 billion or $8,317per capita, for a GDP index value of .854. The HDI in 1990 was .853, and the Shadow Economy equaled 22.9% of the total GDP. The GDP per capita hit its low in 1992, registering $7,168, and rebounded by 1996 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 2.69%.

In 2008, the population of Slovenia increased to 2.02 million. On average, 99.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 92.8%. The education index was .969; 12.59% of Slovenia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .886 with expectancy of 78.2 years. GDP Index was .933, at $16.61 billion and $13,789 per capita. The HDI increased to .929 or 29th in the world. Slovenia's estimated underground economy from 1999 to 2008 averaged 28%, which translates to $7.8 billion in 2008, bringing the gross GDP to $35.68 billion and income per capita, $17,650 per person.

Hungary

The Treaty of Trianon created the Hungarian borders in 1920, which divided the Austro-Hungarian Empire into the Czechoslovakia, Yugoslavia, Austria, Hungary, and small parts of Poland (DOS, 2010, p. Hungary). The territory, excluding Austria, had remained constant from 895

to 1867. In 2007, 90% of Hungary's population was ethnic Myagyar (p. People). Hungary lost

over 50% of its export market when the Soviet Union collapsed. It is plagued with corruption,

and its state-owned industries cannot yet compete with free-market competitors (p. People).

In 1990, the population was 10.37 million, 97% of those above 15 were literate. The

combined gross enrollment was 67.7%. Government expenditures on education were 5.27%.

The education index was 2.73. The Life Expectancy index was .740, life expectancy at birth was

69.4 years. Hungary's GDP was $43.98 billion, $4,240 per capita. GDP index was .812. The

HDI in 1990 was .812. The Shadow Economy equaled 22.3% of the total GDP. The GDP per

capita low was $3,606 in 1993, rebounding in 1999 to exceed levels prior to the USSR breakup.

The average growth rate in GDP per capita from 1990 to 2008 was 2.03%.

In 2008, the population of Hungary had declined to 10.04 million. Average literacy of

those 15 and above was 98.9% from 1999-2007, with combined gross enrollment of 90.2%. The

education index was .960; 11.50% of Hungary's 2000-2008 government expenditure was on edu-

cation. The Life Expectancy Index was .805. Life expectancy was 73.3 years. GDP Index was

.874, with GDP at $62.39 billion and $6,216 per capita. The HDI increased to .879 or 43rd in the

world. Hungary's estimated underground economy from 1999-2008 averaged 25.8%, which

translates to $16.1 billion in 2008, bringing the gross GDP to $78.49 billion and income per capi-

ta, $7,820 per person.

Mongolia

According to DOS, Chinggis (Genghis) Khan created "a single Mongolian state…based

on nomadic tribal groupings" (p. People), in 1206. Mongolia's sovereignty from China depended

on military assistance from the Russian and Soviet Empires 1727 through 1989. The government

began its transition to a democracy after three centuries of communist rule in 2008. Mongolia is

the second largest land-locked country creating Russia's Siberian border of over 3,400 kilome-

ters. With vast mineral deposits and a well-developed agricultural sector, the economy started to

rebound after civil unrest during the 2006 attempt to convert to a transparent market economy (p. Economy). Mongolia is nearly ethnically homogeneous: 94.9% Mongol, 5% Kazakh (CIA, 2010, p. People).

In 1990, Mongolia's population was 2.22 million, 93.0% of those ages 15 and above were literate, with a combined gross enrollment of 65.5%. Of government expenditures, 17.96% were dedicated to public education. The education index was 2.42. The Life Expectancy index was .596 and life expectancy at birth was 60.8 years. Mongolia's GDP was $1.09 billion or $496 per capita, for a GDP index value of .35. The HDI in 1990 was .676.

In 2008, the population of Mongolia increased to 2.64 million. On average, 97.3% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enroll-ment of 79.2%. The education index was .914; 15.94% of Mongolia's 2000-2008 government expenditure was on education. The Life Expectancy Index was .687 with expectancy of 66.2 years. GDP Index was .580. The GDP growth rate was 2.09% to $1.94 billion and $735 per capita. The HDI increased to .727 or 115th in the world. Mongolia's estimated underground economy from 1999 to 2008 averaged 37.9% (Zhou, 2007, p. 23), which translates to $736 mil-lion in 2008, bringing the gross GDP to $2.68 billion and income per capita, $1,014 per person.

Group #3 - Non-USSR Central and Eastern Europe

Neighboring Socialist Countries: Austria, Cyprus, Finland, Greece, Italy, Turkey

   Austria

   According to DOS, The Treaty of St. Germain granted independence to the Austrian Re-public in 1919, after over 700 years in the Hapsburg and Austrian Empires. Austria was annexed by Germany in 1938. It was free and independent again on October 25, 1955, after the signing of the Austrian State Treaty (p. History). "Since 1955, Austria has enjoyed political stability" (p. Political Conditions). According to the WTO, as of 2007, Austria was actively part of trade agreements with ten other countries in the sample set of counties in this thesis (WTO, 2010g). Austria shares borders, over 95% of its borders, with former communist countries, and all of these are still socialist countries.

   In 1990, Austria's population was 7.71 million, 99.0% of those ages 15 and above were literate, with a combined gross enrollment of 77.5%. Of government expenditures, 8.13% were dedicated to public education. The education index was 2.90. The Life Expectancy index was .844 and life expectancy at birth was 75.6 years. Austria's GDP was $149.0 billion or $19,324 per capita, for a GDP index value of .936. The HDI in 1990 was .899. Austria's Shadow Econ-omy equaled 7.0% of the total GDP, the lowest percentage in the sample set. The GDP per capita hit its low in 1992, registering $19,861, and rebounded by 2004 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990-2008 was 1.8%.

   In 2008, the population of Austria increased to 8.34 million. On average, 99.0% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 90.5%. The education index was .962; 11.17% of Austria's 2000-2008 government expenditure was on education. The Life Expectancy Index was .915 with expectancy of 79.9 years. GDP In-dex was .989, GDP rose to $227.1 billion and $27,251 per capita. The HDI increased to .955 or 14th in the world. Austria's estimated underground economy from 1999-2008 averaged 14.6%,

which translates to billion in 2008, bringing the gross GDP to $260.4 billion and income per capita, $31,229 per person.

Greece

The Roman Empire conquered Greece in 146 BC, in the Battle of Corinth, and Constantinople (Istanbul, Turkey) was the capital of the Roman Empire until 1453 (Robinson, 1902, p. 356). Greece expanded its territory to include southern parts of present-day Macedonia, Albania, and Bulgaria (DOS, 2010, p. History). Greece entered WWII fighting alongside the Allies, and then was occupied by Hitler's forces from 1941-1944. With the aid of the 1947 Truman Doctrine that pledged US support for Turkey and Greece against Soviet threats, Greece did not become a communist country and it remains in the territory of ancient Greece (DOS, 2010, p. History). As of 2007, Greece exported over half of its total exported goods to countries in Central and Eastern Europe. Germany received 11.11% of its total, and 11.05% shipped to Italy, 7.28% shipped to Cyprus, and 6.74% to Bulgaria, and Turkey received 4.23%. Germany provided to Greece 13.73% of its imports, Italy 12.71% (p. Economy). Greece's Panhellenic Socialist Movement (PASOK) prevailed in securing a socialistic government for Greece in 1981 and again in 2009 (p. Government). According to the WTO (2010h), as of 2007, Greece was actively part of trade agreements with eight members other counties in the SET. Greece is bounded substantially on its inland borders, with Macedonia and Bulgaria.

In 1990, Greece's population was 10.16 million, 93.2% of those ages 15 and above were literate, with a combined gross enrollment of 77.4%. Of government expenditures, 6.95% were dedicated to public education. The education index was 2.41. The Life Expectancy index was .869, and life expectancy at birth was 77.2 years. Greece's GDP was $99.61 billion or $9,803 per capita, for a GDP index value of .872. The HDI in 1990 was also .872, and the Shadow Economy equaled 23.7% of the total GDP. The GDP per capita hit its low in 1993, registering $9,723, and

rebounded by 1995 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990-2008 was 2.3%.

In 2008, the population of Greece grew to 11.24 million. On average, 97.1% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 100% (p. Table Q). The education index was .981; 9.65% of Greece's 2000-2008 government expenditure was on education. The Life Expectancy Index was .902 with expectancy of 79.1 years. GDP Index was .944, at $170.83 billion and $15,203. The HDI increased to .942 or 25th in the world. Greece's estimated underground economy from 1999 to 2008 averaged 29.9%, which translates to $51 billion in 2008, bringing the gross GDP to $221.92 billion and income per capita, $19,749 per person.

Italy

Italy was a Constitutional Monarchy from 1870 through 1922 after centuries of rule by the Holy Roman Empire. Italy joined the Triple Alliance with Austria-Hungary and Germany from 1882 through 1914. Italy entered WWI on the side of the Allies in an attempt to regain territory lost to Austria. Mussolini began his quest for leadership in 1917, after serving in the infantry in the war on Austria (DOS, 2010, p. People and History). "In 1922, Benito Mussolini came to power and, over the next few years, eliminated political parties, curtailed personal liberties, and installed a fascist dictatorship termed the Corporate State" (p. People and History), allied with Hitler. Italy remained under the control of the Fascist party until Mussolini's over throw in 1943, then had its economic infrastructure decimated as the battlefield of the Italian Campaign (p. History). Before WWII, thousands of unemployed Italians went to work in Germany in factories and shops to back-fill the skill drain from German workers into the military. The Volkswagen plant alone employed fifteen hundred Italian men, who were then denied repatriation into Italy at the start of WWII, as the plant began producing armaments (Burleigh, 1996, p. 43). Italy has been a constitutional republic since 1942 (DOS, 2010, p. Government). Italy claimed itself a Pro-

tectorate State over Albania from June 23, 1917 until 1920, and over Montenegro from 1941-1943. As of 2008, Germany remained Italy's largest export market at 12.8% of its total. Germany sends 16.0% and Russia 4.3% of Italy's total imports (p. Economy). According to the WTO (2010g), as of 2007, Italy was actively part of trade agreements with nine sample set counties in Central and Eastern Europe. Trieste was the southern city on the Adriatic of Churchill's Iron Curtain. Italy borders Slovenia and Austria on its inland border and is less than one hundred miles across the Adriatic Sea from six communist countries and trading partners: Croatia, Bosnia and Herzegovina, Montenegro, Macedonia, Albania, and Greece.

In 1990, Italy's population was 56.72 million, 97.1% of those ages 15 and above were literate. The combined gross enrollment of 77.8%. Of government expenditures, 9.64% were dedicated to public education. The education index was 2.54. The Life Expectancy index was .864. Life expectancy at birth was 76.9 years. Italy's GDP was $937.6 billion or $16,531 per capita, for a GDP index value of .923. The HDI in 1990 was .889. The Shadow Economy equaled 23.4% of the total GDP. The GDP per capita hit its low in 1993, at $16,730, and rebounded by 1994 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was .8%.

In 2008, the population of Italy grew to 59.83 million. On average, 98.9% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 91.8%. The education index was .965; 9.51% of Italy's 2000-2008 government expenditure was on education. The Life Expectancy Index was .935 with expectancy of 81.1 years. GDP Index was .954, at $1,171.8 billion and $19,586 per capita. The HDI increased to .951 or 18th in the world. Italy's estimated underground economy from 1999-2008 averaged 27.2%, or $318.7 billion in 2008, bringing the gross GDP to $1,490.6 billion and income per capita, $24,914 per person.

Turkey

The Republic of Turkey emerged in 1923 after the collapse of the Ottoman Empire. "Turkey entered WW II on the Allied side shortly before the war ended" for security from "demands by the Soviet Union for military bases in the Turkish Straits" (DOS, 2010, p. History). Turkey was not a communist country. Trade relations are strong with the Central and Easter European community, except for Armenia. Turkish forces took part in the blockade of Armenia's rail traffic in 1992, closing its borders to Armenia in 1993. As of 2009, Germany was the largest provider for the Turkish import market, at 9.6%, and Italy provided 5.8% of Turkey's imports. Russia was the largest export market at 14%; Germany was second at 10%, and Italy fifth largest at 5.4%. In 2005, Turkey opened its new oil and gas pipeline with Azerbaijan and Georgia to transport up to a million barrels of Caspian Sea oil a day (p. Economy). As of 2007, Turkey was actively part of trade agreements with ten SET countries (WTO, 2010g).

In 1990, Turkey's population was 56.09 million, 80.7% of those ages 15 and above were literate, with a combined gross enrollment of 55.0%. Government expenditures on education were 15.55%. The education index was 1.82. The Life Expectancy index was .660 and life expectancy at birth was 64.6 years. Turkey's GDP was $186.6 billion or $3,328 per capita, for a GDP index value of .742. The HDI in 1990 was .705, and the Shadow Economy equaled 20.5% of the total GDP (Yereli et al., 2007, p. 89). The GDP per capita hit its low in 1991, registering $3,293, and rebounded by 1992 to exceed levels prior to the USSR breakup. The average annual growth rate in GDP per capita from 1990 to 2008 was 2.2%.

In 2008, the population of Turkey grew to 73.91 million. On average, 88.7% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 71.1. The education index was .828; Turkey's 2000-2008 government expenditure on education was 14.74% of total government expenditures. The Life Expectancy Index was .779 with expectancy of 71.7 years. GDP Index was .812, GDP increased to $375 billion and $19,586 per capita.

The HDI increased to .806 or 79th in the world. Turkey's estimated underground economy from 1999-2008 averaged 32.9%, which translates to $123 billion in 2008, bringing the gross GDP to $498.47 and income per capita, $6,744 per person.

Cyprus

Cyprus is located in the Mediterranean Sea, near the Balkan Peninsula, 47 miles south of Turkey. Cyprus was under the protection of Great Britain as a Crown Colony since 1878, after centuries in the Ottoman Empire. The Zurich and London Agreement between the United Kingdom, Greece and Turkey on August 16, 1960. After a coup d' etat by the Greek Junta in 1974, it was taken by force by Turkish troops. As of 2006, Cyprus had a democratically elected communist government and it remains a trading partner with much of Europe. As of 2007, the largest export markets for Cyprus were the UK, Greece, and Russia. The largest import markets are Greece, Italy, and Germany (DOS, 2010, p. People and History). According to the U.S. Library of Congress (1991), in 1960, the census reported seventy-seven percent of the population of Cyprus was Greek Cypriots, and twenty-three percent Turkish Cypriots. In the five years after the invasion by Turkish troops, 65,000 Cypriots emigrated, more than a third of whom went to Greece and Britain. Although the government declared itself a democratic republic in 1964, it remains Socialistic in character; as of "1986 fully 64% of the population [remains] living in government-controlled areas of Cyprus (p. Population)," and high tariffs remained in place through the early 1990s to protect native industries (p. Economy). According to the WTO, as of 2007, Cyprus was actively part of trade agreements with ten members SET counties (WTO, 2010g).

In 1990, Cyprus's population was .68 million, 87.0% of those ages 15 and above were literate, with a combined gross enrollment of 62.4%. Government expenditures on education were 13.17% of total government expenditures. The education index was 2.27. The Life Expectancy index was .859 and life expectancy at birth was 76.5 years. Cyprus's GDP was $6.19 billion or $10,684 per capita, for a GDP index value of .850. The HDI in 1990 was .849, and the

Shadow Economy equaled 21% of the total GDP. The GDP per capita hit its low in 1991, regis-

tering $10,488, and rebounded by 1994 to exceed levels prior to the USSR breakup. The average

annual growth rate in GDP per capita from 1990-2008 was 1.9%.

In 2008, the population of Cyprus grew to .86 million. On average, 97.7% of those ages

15 and above were literate from 1999-2007, with combined gross enrollment of 77.6. The educa-

tion index was .910; 13.64% of Cyprus's 2000-2008 government expenditure was on education.

The Life Expectancy Index was .910 with expectancy of 79.6 years. GDP Index was .920; GDP

doubled to $12.3 billion and $15,510. The HDI increased to .914 or 32nd in the world. Cyprus's

estimated underground economy from 1999 to 2008 averaged 29.4%, which translates to $3.6 bil-

lion in 2008, bringing the gross GDP to $15.92 billion and income per capita, $20,069 per person.

Finland

The geography occupied by Finland today has been roughly the same for about 900

years. From 1154-1809 subject to the Kingdom of Sweden, as the Grand Duchy of Finland, sub-

ject to the Russian Empire until 1917, and the Independent Finnish Republic since. However,

Finland was a pawn in the Molotov-Ribbentrop non-aggression pact between Germany and the

Soviet Union, falling under the "Soviet Sphere of Influence" forcing Finland to defend itself from

the Soviet Union in the Winder War of 1939-1940 (DOS, 2011, p. Finland, History). "During

Continuation War (1941-1944), Finland was a co-belligerent with Germany" (p. History) against

the Soviet Union. During the "Lapland War of 1944-1945, Finland fought against the Germans"

(p. History). Finland was neutral after WWII, under the Finno-Soviet Pact of Friendship that

lasted from 1948 to 1992 (p. History).

In 1990, Finland's population was 4.99 million, with a combined gross enrollment of

62.4%, and a 99.6% adult literacy rate. Government expenditures on education were 11.9% of to-

tal government expenditures. The Education Index was 2.25. The Life Expectancy index was

.759 and life expectancy at birth was 70.5 years. Finland's GDP was $99.3 billion, $19,916 per

capita. GDP index was .904. The HDI in 1990 was .959, and the Shadow Economy equaled 14.5% of the total GDP. The GDP per capita hit its low in 1993, registering $17,638, and rebounded by 1997 to exceed levels prior to the USSR breakup. GDP per capita average annual growth rate from 1990 to 2008 was 1.9%.

In 2008, the population of Finland grew to 5.31 million. On average, 99% of those ages 15 and above were literate in the years from 1999-2007, with combined gross enrollment of 77.6. The education index was .960; 12.59% of Finland's 2000-2008 government expenditure was on education. The Life Expectancy Index was .77 with expectancy of 71.6 years. GDP Index was .920; GDP increased to $153.77 billion and $28,941 per person. The HDI increased to .959. Finland's estimated average underground economy from 1999-2008 was 18.5%, which translates to $28.44 billion in 2008, bringing the gross GDP to $182.23 billion and income per capita, $34,295 per person.

Countries excluded from the Sample Set

China

China passes the first three rules of thumb: geographic, ethnolinguistic, and trade; but was communist with its own force of power. Unlike Mongolia, China operated a sovereign socialist state headed by Mao Zedong with the resources to maintain economic viability. "Outside the Soviet sphere of control…. The dispute between militant China and the more moderate Soviet Union escalated into a schism in the world communist movement after 1960" (LOC, 2011a, p. Russia).

Sweden, Switzerland, The Netherlands

These countries pass the first three rules of thumb. According to the DOS (2011), Sweden was officially neutral during both WWI and WWII; it did support the war efforts on both sides with steel and "followed a policy of armed neutrality" during WWII (p. Sweden, History). Switzerland remained neutral during the 20th century, though it did defend its own air space dur-

ing WWII (p. Switzerland, History). "The Netherlands proclaimed neutrality at the start of both world wars" (p. Netherlands, History). During WWI, however, it was used heavily for its trade routes. German forces invaded The Netherlands in 1940, which remained occupied until 1945, after which it became a founding member of NATO (p. History).

Vietnam, Cuba, North Korea

These countries are not included in the sample set. While politically and economically aligned with the former USSR, none pass the geographic rule of thumb.

Country Brief Summary

The Sample Set of countries analyzed follows the grouping used by Schneider et al. (2010). However, the groupings between Central, Southern, and Eastern Europe, and Central and Western Asia vary greatly depending on the rise and decline of empires, armed conflict, and political agenda. Countries of both the former Czechoslovakia and former Yugoslavia are included in the sample set, as disaggregated data are widely available, and the standard for cross-country analysis (HDR, 2009). The German Democratic Republic (GDR) is included the sample set in Group II, as post-German reunification data aggregate GDR with West Germany (FDR). Including Mongolia in the sample set captures the ethnolinguistic strength of the Mongolian Empire that began in centered in Mongolia and spread outward toward Central and Easter Europe and south and east toward today's China; the Mongolian emigration is significant in Central and Easter Europe, while the Chinese emigration west is scant (DOS, 2010b, p. Mongolia).

Group III is a challenge in the sample set. For all of the empirical data-driven reasons stated above, and these few to follow, this group of countries is substantially similar in that the end of the Cold War marked the end of an economic era, and an economic low point or trough. However, including these countries may add ambiguity to the results, or, it may make the results clearer. Countries that were influenced by the Cold War but not part of the former USSR or one of its satellite states may have had fewer of the symptoms of economic growth handcuffs endured by communistic countries.

In Group III, Austria, Greece, Italy, Turkey, and Cyprus occupy the area of the Roman Empire, and Finland was part of the Sweden after about 800 and the Swedish Empire after 1611. Austria became part of the Hapsburg Empire and Greece, Turkey, Italy and Cyprus remained part of the Eastern Roman Empire until 1453. Through WWI, the region experiences successive wars. Austria was occupied by a communist regime for 20 years, and is included in the sample set. Greece was occupied for four years by a communist regime, is on the Balkan Peninsula, and has a

socialist government. Italian forces invaded Greece in the Greco-Italian War in 1940 (DOS, 2010, p. Greece). Greece occupied parts of Albania, Macedonia, Bulgaria, and Turkey during its expansionary years between 1913 and 1923 (p. History). Italy allied itself with a communist regime for seventeen years, is geographically contiguous to two Socialist states, and is fewer than one hundred miles by sea from five more. Turkey is in the middle of the Balkan Peninsula and Cyprus is 47 miles south in the Mediterranean; each remain key trading partners and with former Soviet countries, and have strong geopolitical ties with Greece and Germany. Turkey occupied Cyprus in 1974, and has an elected communist government.

As time goes on the hindsight becomes clearer, history will inform the community of researchers if this trough marked the start of a grand, 50 or 60-year period of "Take-off…when the old blocks and resistances to steady growth are finally overcome. The forces making for economic progress … expand and come to dominate society….Growth becomes normal, compound interest becomes built…into habits of institutional structure." On the other hand, was the country too suppressed that it was ready only to build the "pre-conditions for Take-Off", where a decisive feature is a new sense of nationalism, and major changes in social values and a shift in the economy (Rostow, 1991, p. 7). Empirical data are clear; the economic depression hit every Central and Eastern European country, and many others around the world, while the economic dust settled along with that at the crumbled Berlin Wall.

There are risks in including or excluding Groups II and III. Including both groups, the number in the sample set grows from fifteen to thirty-six countries. In *Basic Economics*, Gujarati & Porter (2009, p. 345) state, "sometimes, simply increasing the sample size (if possible) may attenuate the collinearity problem... the variance will decrease thus decreasing the standard error." The caution is to avoid "over-fitting" the model just to increase the goodness of fit, R^2, because the addition of unnecessary variables will lead to a loss in the efficiency of the estimators and may also lead to the problem of multicolinearity, not to mention a loss in degrees of freedom" (p.

474). Given that the countries in Groups II and III exhibit the symptoms of an economic depres-

sion (Burns & Mitchell, 1946) at the end of the Cold War and are Socialist by this thesis'

standards, they belong in the sample group. Given that these same countries endured extraordi-

nary influence by the Soviet Empire during the Cold War, and share borders, and to some degree,

nationalities, religions, heritages, cultures, and histories, they should be included in the sample

group. Lastly, since these countries are now, are again, or have continued to be trading partners

and therefore, are linked economically, these counties belong in the sample group. Under-fitting

the model, omitting a relevant variable, essentially trades less precision for greater bias (p. 473).

"Thus, if economic theory says that [Groups II and III] …should both be included in the model

explaining the…[change in income], dropping [one or the other Group] would constitute specifi-

cation bias (p. 344)."

APPENDIX B: DATA RELIABILITY AND VALIDITY

The overarching theory employed herein is Romer's New Growth Theory (NGT), which contends that both endogenous and exogenous factors influence growth of an economy. Reliability of the data and validity of the construct confirm that the data gathered 'hit the bull's eye' of the research object, or the research goal. Romer (1994b, p. 21) suggests important policy implications of this theory. In addition to Romer (1986, 1990, 1994b, 1998b, 2007), the work of many scholars supports NGT. Recall that exogenous sources include among other factors, exogenous technological advancement, and knowledge spillovers from outside (Solow, 1957; North, 1994), and radical shaping events (*e.g.,* armed conflict, regime change, famine) (Rostow, 1991). Endogenous sources of growth include inertia (North, 1991a; Cortright, 2001), technology diffusion and adoption rates (Nelson et al., 1966, p. 71). Education (Sen, 1997; Barro et al., 2001), specialization, and knowledge externalities are endogenous with increasing returns (Arrow, 1962; North, 1991a; Phelps & Nelson, 1995). Finally, the national-level government (Galbraith, 1951; Rostow, 1991; Barro, 2001a), governance, institutions, and the policies set for national-level budgets and factors of development, education, and control over corruption are endogenous factors (Rose-Ackerman, 1978; Klitgaard, 1988; deLeon, 1993; Mauro, 1995; Johnston, 2005; Kaufmann, 2006). The major source of data is the Human Development Reports. Before we begin describing the data analysis method, we must test the data reliability, and the validity of both the construct and of the SET data.

HDR data for the Central and Eastern European SET

From the start of the Human Development project in 1990, the Human Development Report for years 1990 to 2007 includes only that data which are deemed reliable, timely, verifiable and provided by "leading international data agencies at the time" (*e.g.,* United Nations, IMF, World Bank, EuroStat, UNESCO, WHO, OECD) (2008c, p. 225). Therefore, as iterative research uncovers new data, more countries are added, more indicators are added to the total

report, and more data points are added to that years' HDI, making it increasingly more reliable over time (HDR, 1990, pp. 111-112, 2008c, pp. 223-227). While the underlying data was becoming more robust, the relativity of the component indices (used herein) has remained constant. In several circumstances, the HDR adopted a new methodology and provided tables reflecting the old and new data (p. 227).

Test Equation 1.1: HDI Data Reliability

First, we will test the reliability of the Human Development Index in 1990 (HDI_{1990}) for the SET countries versus the population of countries, following Gujarati & Porter (2009). We will run a linear regression using the HDI component indices as independent variables, predicting the overall HDI_{1990} on SET. We will do the same for the HDI_{2007}.

Null Hypothesis: $H_0 : HDI_{1990} \neq GDPI_{1990} + LEI_{1990} + EAI_{1990}$

Maintained Hypothesis: $H_1: HDI_{1990} = GDPI_{1990} + LEI_{1990} + EAI_{1990}$

Test Equation 1.2: HDI Data Reliability

Null Hypothesis: $H_0 : HDI_{2007} \neq GDPI_{2007} + LEI_{2007} + EAI_{2007}$

Maintained Hypothesis: $H_1: HDI_{2007} = GDPI_{2007} + LEI_{2007} + EAI_{2007}$

If the SET data yield statistically significant and similar results to the population set (POP), then the SET data are reliable, and the SET data reflects the variations identified in POP.

If the variation in the change in HDI from 1990 to 2007 is largely explained by the change in the HDI component indices from 1990 to 2007, my research construct was invalid, and we need not explain the any balance of variation with other variables (Weimer, 1998). In other words, if the 1990 to 2007 change in the GDPI, the LEI, and EAI, equally weighted, offer sufficient explanatory power of the change in the HDI for the SET, then we needn't look to corruption or education spending to further explain the HDI change in the SET. If the change in HDI does not equal the change in the component indices, then we will reject the null hypothesis and accept

188

for now that at least one other variable explains the variation in the change in HDI over our date range. We will run a linear regression for this test.

Test Equation 2.1: HDI Construct Validity Testing

Null Hypothesis: H_0: ΔHDI = ΔGDPI+ ΔLEI+ Δ EAI

Maintained Hypothesis: H_1: ΔHDI $\neq$ ΔGDPI+ ΔLEI+ ΔEAI

Lastly, we will run a linear regression using the ΔIc as the dependent variable, and the ΔHDI to make sure that the construct remains valid when testing the relative change, adding confidence to the internal validity of the data (Gujarati & Porter, 2009).

Test Equation 2.2: HDI Construct Validity Testing

Null Hypothesis: H_O : ΔIc = ΔHDI

Maintained Hypothesis: H_1 : ΔIc $\neq$ ΔHDI

If we reject the null hypotheses, then we can conclude for now that the variation in the ΔIc from 1990 to 2007 cannot be explained by the ΔHDI alone. Assuming the null hypotheses are rejected, this concludes the construct validity testing for the HDR variables. From this point, we can test the HDI data being confident that SET represents the population, and that the test methods are generalizable for the entire population set, and the data are externally valid.

Shadow Economy Data for the Central and Eastern Europe SET

Schneider, 2010, provides the statistics on the SE data. To test the reliability of Sample SET countries, we will run a paired-t test to compare the average SE for each year for the SET to the average for each year of the Population (POP) set (pp. 44-45).

Test Equation 3.1: SE Data Reliability

Null Hypothesis: H_O : Mean Yearly Ave of Set $\neq$ Mean Yearly Ave of SET

Maintained Hypothesis: H_1 : Mean Yearly Ave of Set = Mean Yearly Ave of SET

If we reject the null hypothesis, we can conclude temporarily that SET average represents the POP average for each year of the study at 95% confidence level. To test the validity of the

construct, we will use a paired-t test to test the average SE on the SET countries using the two sets of sampling specifications found in Schneider, 2010, looking for equality in the averages. The study employs' a "Multiple Indicators Multiple Causes (MIMIC) model – a particular type of a structural equations model (SEM) – to analyze and estimate the shadow economies of 162 countries around the world (p. 10).

Test Equation 3.2: SE Data Reliability and Validity

Null Hypothesis:

H_O : Mean Ave SE / Country MIMIC6 ≠ Mean Ave SE / Country MIMIC7

Maintained Hypothesis:

H_1 : Mean Ave SE / Country MIMIC6 = Mean Ave SE / Country MIMIC7

If we reject the null hypothesis, we can conclude temporarily (given both the MIMIC6 and MIMIC7 data sets are reliable for the population of countries (p. 17)) that the SET data are valid, and we can test the size of the Shadow Economy as specified in the models used by Schneider.

Educational Expenditure data for the SET

To test the reliability of the SET of EE data, we start with the education data set for the entire population of countries, EdStats, provided by UNESCO (United Nations Education, Science and Culture Organization) and the data methodology from the technical reference manual (1998). EdStats Reports for years 1970 to 2007 includes only that data which are deemed reliable, timely, verifiable and follow the Statistical Information System on Expenditure in Education (SISEE) methodology protocols (1998). Therefore, as iterative research uncovers new data, more countries are added, more indicators are added to the total report, and more data points are added to that years' statistics, making it increasingly more reliable over time.

In 1970, UNICEF gathered EE data on 71 countries data, 102 countries in 1975, and for the decade of the 1970's, UNICEF gathered data on 143 countries and 263 data points. Only 13

of those data points were from SET; too scant for statistical reliability. From 1980 to 1988,

UNICEF gathered data on 152 countries and 294 data points, 19 countries from the SET reported

39 data points. From 1998 to 2007, UNESCO gathered 156 country reports on 785 EE data

points, 29 countries from the SET reported 172 data points. The pre-test EE uses the average EE

from 1980 to 1988, and the post-test EE uses the average EE from 1998 to 2007.

To test the data validity of the SET, we will use the un-paired-t test for both the pre-test

and post-test data. If we reject the null hypothesis, we can conclude for now that the SET for EE

data is reliable and valid, and we can proceed with testing our theory.

Test Equation 4: EE Data Validity

Null Hypothesis: H_O : Mean Ave EE of Data Set $\neq$ Mean Ave EE Sample SET

Maintained: H_1: Mean Ave EE of Data Set = Mean Ave EE Sample SET

Assuming that the data are reliable, and the tests for construct validity confirm that the

data gathered allow me to test my research object, then the construct validity is finished and we

can move on to validating the data

New Variables

The last step in defining the data is to create new variables by including the factor of the

SE on variables calculated using GDP. Recall, that subscript $1(_1)$ denotes an Official figure as

stated by the country in National Income Accounting, subscript 2 $(_2)$ denotes the unofficial fig-

ures (Schneider et al., 2010b), and subscript $3(_3)$ denotes the sum of official and unofficial figures

(own calculations). In addition, the subscript for the year may be necessary on some data. Total

$GDP = GDP_3$, the Shadow Economy's portion of the $GDP = GDP_2$, and the Official $GDP =$

GDP_O. The equation, then, is $GDP_1 + GDP_2 = GDP_3$, and $Ic_1 + Ic_2 = Ic_3$. Each of the component

measures of the HDI that include or are derived from the official GDP must be enhanced to in-

clude the effects of that GDP in the Shadow Economy.

For example, the Official GDP_{1990} in Ukraine was \$243.35 billion in US equivalent dollars. The 16.3% SE_{1990} was \$39.66 billion, for a Total GDP_{1990} of \$283.01 billion. The equation for $Ic_{3\ 1990}$ is \$4,716 $Ic_{1\ 1990}$ + \$769 $Ic_{2\ 1990}$ = \$5,485 in equivalent US dollars per capita. Stated otherwise, the official data report that the Ukrainian people earn \$4,716 US equivalent dollars per person, but the SE makes up 16.3% of the total economy. Therefore, Ukrainians actually earn \$5,485 US equivalent dollars on average.

The second set of variables is the education funds that are a percentage of GDP_1. The official Education Expenditure = EE_1. The SE effective reduction of EE = EE_2. Therefore, EE's percentage of actual Government Expenditures = EE_3.

Example: $EE_{1\ Ukraine}$ + $EE_{2\ Ukraine}$ = $EE_{3\ Ukraine}$

$$15.95\% \ _1 \text{of GE} + - (16.3\% \text{ SE} \times 15.95\% \text{ GE})_2 = 13.7145_3 \text{ % of GE}$$

Alternate Equation, in US \$Billions:

$$\frac{15.95\% \text{ of GE} \times \$243.35 \text{ GDP}_1}{\$243.35 \text{ GDP}_1 + (16.3\% \times \$243.35 \text{ GDP}_1)} = \frac{\$3,881.43 \text{ GE}_1}{\$243.35 \text{ GDP}_1 + \$39.661 \text{ GDP}_2} = \frac{\$3,881.43 \text{ GE}_1}{\$283.01 \text{ GDP}_3} =$$

$13.7148\% \text{ of GDP}_3$ Expenditures

Otherwise stated, the official figure for EE is 15.95% of government spending. However, since the SE effectively keeps 16.3% of the potential government revenue out of the government budgets, the official number is overstated, and education actually realizes, all else equal, 13.7148% of the Government Expenditure budget. The SE is keeping for its use about \$750 per Ukrainian citizen per year, given the policy is to invest 15.95% of its expenditure budget into public education.

Data and Construct Reliability and Validity Test Analysis

Table 7.4 Correlation Coefficient Matrix.

Correlate the change in Total Income per Capita, change in Total Education Expenditures, pre-test Human Development Index, pre-test Shadow Economy, change in Life Expectancy Index, change in Education Attainment Index, post-test Shadow Economy, change in Shadow Economy, Country Group.

Test: Correlate $\$\Delta$Ic3, $\$\Delta$EEc3, HDI_{1990}, SE_{2008}, ΔLEI, ΔEAI, SE_{1990}, ΔSE, Group, (obs=36)

Variable	$\$\Delta$Ic3	$\$\Delta$EEc3	HDI_{1990}	SE_{2008}	ΔLEI	ΔEAI	SE_{1990}	ΔSE	Group
$\$\Delta$Ic3	1.0000								
$\$\Delta$EEc3	0.8619	1.0000							
HDI_{1990}	0.7710	0.5549	1.0000						
SE_{2008}	-0.6876	-0.5285	-0.6040	1.0000					
ΔLEI	0.0807	0.1046	-0.1254	-0.1996	1.0000				
ΔEAI	0.2757	0.2394	0.4848	-0.2350	-0.0567	1.0000			
SE_{1990}	-0.5863	-0.5108	-0.4409	0.8660	-0.0844	-0.2308	1.0000		
ΔSE	-0.1260	0.0618	-0.3071	0.1641	-0.1256	0.0313	-0.3163	1.0000	
Group	0.6549	0.5661	0.5648	-0.6958	0.3222	-0.0434	-0.6077	-0.0898	1.0000

A linear regression tested data reliability of the Central and Eastern Europe sample set (SET) from HDI_{1990} as the dependent variable, versus the entire data set of countries. The HDI component indices are the independent variables, predicting the overall HDI_{1990} on the sample countries.

Test Equation 1.1: HDI Data Reliability

Null Hypothesis: $H_0 : HDI_{1990} \neq GDPI_{1990} + LEI_{1990} + EAI_{1990}$

Maintained Hypothesis: $H_1: HDI_{1990} = GDPI_{1990} + LEI_{1990} + EAI_{1990}$

Test: Linear Regression95% Confidence Level

Regress dependent variable HDI1990 against independent variables GDPI1990, LEI1990, and EAI1990

```
      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =  119.18
       Model | .124129608      3  .041376536           Prob > F      =  0.0000
    Residual | .010415456     30  .000347182           R-squared     =  0.9226
-------------+------------------------------           Adj R-squared =  0.9148
       Total | .134545064     33  .004077123           Root MSE      =  .01863
---------------------------------------------------------------------------------
     HDI1990 |     Coef.   Std. Err.      t    P>|t|      [95% Conf. Interval]
-------------+-------------------------------------------------------------------
    GDPI1990 |  .2874717   .0488198     5.89   0.000     .1877685    .3871749
     LEI1990 |  .3869957   .0748015     5.17   0.000     .2342306    .5397607
     EAI1990 |  .0525218   .0176434     2.98   0.006     .0164893    .0885544
       _cons |  .1577265   .0490298     3.22   0.003     .0575943    .2578586
```

The regression showed with 95% certainty that variation in the HDI component indices for the sample set explained 91.48% of the variation HDI_{1990}. Each of the independent variables proved to be significant, as well, with a high *F*-score on 33 degrees of freedom. Gujarati, et al. (2009) provides the following "*2-t* Rule of Thumb." "If the Number of degrees of freedom is 20 or more, and if α, the level of significance, is set at .05, then the null hypothesis [β2= or $\neq$ 0] can be rejected if the t value… exceeds 2 in absolute value". Under this rule, the null hypothesis is rejected. "[T]he *p*-value is defined as the lowest significance level at which a null hypothesis can be rejected" (p. 122). The highest *p*-value is for EAI, .006, or EAI would be rejected at a 99.95% confidence level. The high *F*-score and high adjusted-R^2 scores are mostly a product of the independent variables being components of the HDI. The rejected null hypothesis allows for temporarily concluding that HDI_{1990} components of the sample set are a reliable predictor of the composite of the sample set HDI_{1990}. The same regression for the HDI_{2007} tested the 2007 data.

Test Equation 1.2

$\textit{Null Hypothesis}$: $H_0 : HDI_{2007} \neq GDPI_{2007} + LEI_{2007} + EAI_{2007}$

$\textit{Maintained Hypothesis}$: $H_1: HDI_{2007} = GDPI_{2007} + LEI_{2007} + EAI_{2007}$

Test: Linear Regression 95% Confidence Level

Regress dependent variable HDI_{2007} using independent variables $GDPI_{2007}$, LEI_{2007}, and EAI_{2007}

```
      Source |       SS       df       MS              Number of obs =      35
-------------+------------------------------           F(  3,    31) =44499.97
       Model | .182026005     3  .060675335            Prob > F      =  0.0000
    Residual | .000042268    31  1.3635e-06            R-squared     =  0.9998
-------------+------------------------------           Adj R-squared =  0.9997
       Total | .182068273    34  .005354949            Root MSE      =  .00117

------------------------------------------------------------------------------
     HDI2007 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    GDPI2007 |   .3358158   .0025453   131.93   0.000     .3306245    .3410071
     LEI2007 |   .3296197     .00406    81.19   0.000     .3213392    .3379002
     EAI2007 |   .3338652   .0067689    49.32   0.000     .3200599    .3476706
       _cons |   .0001469   .0064856     0.02   0.982    -.0130806    .0133744
```

The results of this 2007 test are more significant, as the data are a product of 16 iterations of HDI Reports, and with more data points on more countries by the international research agencies. The three component indices on 36 countries in the Central and Eastern Europe are each significant past the 99.99% level, and the overall regression describes 99.97% of the variation in the HDI_{2007}. The rejected null hypothesis allows for temporarily concluding that the components contribute to the variance in the composite, and the data in the sample set are reliable.

Wainer, et al. 1998 (in Golafshani) ask to identify validity, whether the data and research instrument allow the researcher to '"hit the bull's eye' of the research object" (2003. p. 2). The 'object' for this thesis being a sample set useful for testing corruption's effects on education budgets and individual income. In the prior two tests the data are, with 95% certainty or greater, valid and reliable for the sample set in 1990 HDI. For the 2007 data sample set, the HDI components were much closer to the 'bull's eye' predicting the overall HDI_{2007} at over 99.9% level of certainty.

Construct Validity Testing

A linear regression tests whether the ΔHDI does not equal the change in the component indices, a rejected the null hypothesis allows for temporarily accepting that at least one other variable explains the variation in the ΔHDI over the date range.

Test Equation 2.1: HDI Construct Validity Testing

Null Hypothesis: H_0: ΔHDI = ΔGDPI+ ΔLEI+ Δ EAI

Maintained Hypothesis: H_1: ΔHDI ≠ ΔGDPI+ ΔLEI+ Δ EAI

Test: Linear Regression 95% Confidence Level

Regress dependent variable ΔHDI using independent variables ΔGDPI, ΔLEI, and ΔEAI

```
      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =    7.23
       Model |  .013050195     3   .004350065           Prob > F      =  0.0009
    Residual |  .018060088    30   .000602003           R-squared     =  0.4195
-------------+------------------------------           Adj R-squared =  0.3614
       Total |  .031110282    33   .000942736           Root MSE      =  .02454

------------------------------------------------------------------------------
        ΔHDI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       ΔGDPI |   .1223597   .0547086     2.24   0.033     .0106298    .2340895
        ΔLEI |   .2706155   .0781373     3.46   0.002     .1110379    .4301931
        ΔEAI |   .0006193   .0005106     1.21   0.235    -.0004234    .0016621
       _cons |   .0340377   .0065947     5.16   0.000     .0205696    .0475058
```

The data show that with 95% certainty, 36% of the variation in the change in the HDI from 1990 to 2007 is attributable to the change in the equally weighted component indices. Of these results, the change in the Educational Attainment Index (EAI) produced the least significant result. This result suggests that the effect of the EAI on the variation in the HDI for this sample of countries is unsure. This result also supports testing alternative education measures that may add explanatory power to the equation.

To test whether Ic is a sufficient proxy for individual human development, as part of the construct-validity testing with the sample data, a linear regression analysis substituting ΔIc as the dependent variable, and the ΔHDI as the independent variable.

Test Equation 2.2: HDI Construct Validity Testing

Null Hypothesis: $H_O : \Delta Ic = \Delta HDI$

Maintained Hypothesis: $H_1 : \Delta Ic \neq \Delta HDI$

Test: Linear Regression95% Confidence Level

Regress dependent variable ΔIc with independent variable ΔHDI

```
      Source |       SS       df       MS              Number of obs =      32
-------------+------------------------------           F(  1,    30) =    8.19
       Model | 23.1670932      1  23.1670932           Prob > F      = 0.0076
    Residual | 84.9092157     30  2.83030719           R-squared     = 0.2144
-------------+------------------------------           Adj R-squared = 0.1882
       Total | 108.076309     31  3.48633254           Root MSE      = 1.6824

-----------------------------------------------------------------------------
         ΔIc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+---------------------------------------------------------------
        ΔHDI |   31.72859       11.09     2.86   0.008     9.079775    54.3774
       _cons |   .8248046    .6674307     1.24   0.226    -.5382707    2.18788
```

A rejected null hypothesis allows us to conclude temporarily that the variation in ΔIc from 1990 to 2007 cannot be explained by ΔHDI from 1990 to 2007 alone. This result concludes the construct validity testing. With a *t*-value of 2.86, an *F*-score of 8.19 and 31 degrees of freedom, this test passes the *2-t* Rule of Thumb. Now, we can test the HDI sample data confident that the SET represents the population, the test methods are generalizable for the population of countries, and the data are externally valid.

Shadow Economy Data for the Central and Eastern European SET

To test the reliability of the SET, we will run a paired *t*-test to compare the average SE for each year for the Sample Set to the average for each year of the Set.

Test Equation 3.1: SE Data Reliability

Null Hypothesis: H_O : Mean Yearly Ave of SE Set = Mean Ave of SE SET

Maintained Hypothesis: H_1 : Mean Yearly Ave of Set $\neq$ Mean Ave of SET

Test: Two-Sample Unpaired t-test   99.9% Confidence Level

Compare the Mean of the SE Set to SE SET.

```
Variable |      Obs        Mean    Std. Err.    Std. Dev. [99.9% Conf. Interval]
---------+----------------------------------------------------------------------
 AVE70SET|       29    12.94213    .7020142     3.780462      10.363     15.52127
 AVE07set|      156    15.25357    .3839153       4.7951    13.96576     16.54138
---------+----------------------------------------------------------------------
combined |      185    14.89124    .3468313     4.717416    13.73137     16.05111
---------+----------------------------------------------------------------------
    diff |             -2.311439    .9411754                -5.459185     .8363066
----------------------------------------------------------------------------------
    diff = mean(AVE07SET)       - mean(AVE07Set)                   t =   -2.4559
Ho: diff = 0                                          degrees of freedom =      183

   Ha: diff < 0                   Ha: diff != 0                    Ha: diff > 0
 Pr(T < t) = 0.0075         Pr(|T| > |t|) = 0.0150            Pr(T > t) = 0.9925
```

In this case, the null hypothesis is maintained. The report above maintain that there is a .992% probability that the true average of the Set is greater than the average of the Sample Set, yet still remains in the acceptance area for the null hypothesis, we can conclude temporarily that the sample set average represents the POP average for each at 99.9% confidence level.

To test the validity of the construct, an un-paired *t*-test compares the average SE on the same countries on the same years using the two sets of sampling specifications found in Schneider, 2010, looking for equality in the averages between two sets of specifications.

198

Test Equation 3.2: SE Data Reliability and Validity

Null Hypothesis:

H_O : Mean Ave SE / Country MIMIC6 $\neq$ Mean Ave SE / Country MIMIC7

Maintained Hypothesis:

H_1 : Mean Ave SE / Country MIMIC6 = Mean Ave SE / Country MIMIC7

Test: Two-Sample Paired *t*-test 95% Confidence Level

Compare the Mean of the Ave SE MIMIC6 to Mean Ave SE MIMIC7 set.

```
Variable |      Obs        Mean     Std. Err.    Std. Dev.    [95% Conf. Interval]
---------+-----------------------------------------------------------------------
  MIMIC7 |       23     33.56957    2.517664    12.07429     28.34825     38.79088
  MIMIC6 |       23     38.67391    2.421586    11.61352     33.65185     43.69598
---------+-----------------------------------------------------------------------
    diff |       23    -5.104348    1.050569     5.038351    -7.283094    -2.925602
--------------------------------------------------------------------------------
    mean(diff) = mean(MIMIC7 - MIMIC6)                              t =   -4.8587
 Ho: mean(diff) = 0                                degrees of freedom =       22

 Ha: mean(diff) < 0            Ha: mean(diff) != 0            Ha: mean(diff) > 0
 Pr(T < t) = 0.0000        Pr(|T| > |t|) = 0.0001            Pr(T > t) = 1.0000
```

In the case above, the null hypothesis is maintained. The report above maintains that there is a 1% probability that the true average of the MIMIC6 of the Sample Set is greater than the average of MIMIC7 of the Sample Set, well past the rejection area for the null hypothesis. The temporary conclusion is that the Sample Set average MIMIC6 is lower than the Sample Set Average for MIMIC7 (given both the MIMIC6 and MIMIC7 data sets are reliable for the population (p. 17)). Further, that the sample set of data are valid, and test the size of the SE as specified in the models used by Schneider.

To test the construct that the SE affects the ΔIc, the linear regression sets ΔIc as the dependent variable and the pre and posttest SE as the independent variable.

Test Equation 3.3: Shadow Economy variables.

Null Hypothesis: H_O : $\Delta Ic = SE_{1990} + SE_{2008}$

Maintained Hypothesis: H_1 : $\Delta Ic \neq SE_{1990} + SE_{2008}$

Test: Linear Regression95% Confidence Level

Regress dependent variable ΔIc with independent variables SE_{1990} and SE_{2008}

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  2,    33) =    14.82
       Model |  157229888      2  78614943.8           Prob > F      =   0.0000
    Residual |  175083260     33  5305553.32           R-squared     =   0.4731
-------------+------------------------------           Adj R-squared =   0.4412
       Total |  332313147     35  9494661.35           Root MSE      =   2303.4
       Dch3Ic |     Coef.   Std. Err.       t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SE90 |   13.29645   91.45118     0.15    0.885    -172.7624    199.3553
        SE08 |  -183.3104   64.37775    -2.85    0.008    -314.2879   -52.33289
       _cons |   9196.633   1283.722     7.16    0.000     6584.882    11808.39
```

Rejection of the null hypothesis supports the construct and suggests a stronger relationship between the 2008 Shadow Economy figures than the 1990 figures. Only 44.12% of the variation in the dependent variable is explained with the two SE variables. Regressing each separately as suggested by Gujarati, et al. (2009) shows the following results.

Test Equation 3.4: Shadow Economy variables.

Null Hypothesis: H_O : $\Delta Ic = SE_{1990}$

Maintained Hypothesis: H_1 : $\Delta Ic \neq SE_{1990}$

Test: Linear Regression95% Confidence Level

Regress dependent variable ΔIc with independent variable SE_{1990}.

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  1,    34) =    17.80
       Model |  114213558      1   114213558           Prob > F      =   0.0002
    Residual |  218099590     34  6414693.81           R-squared     =   0.3437
-------------+------------------------------           Adj R-squared =   0.3244
       Total |  332313147     35  9494661.35           Root MSE      =   2532.7
       Dch3Ic |     Coef.   Std. Err.       t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SE90 |  -212.2003   50.28924    -4.22    0.000    -314.4003   -110.0002
       _cons |   8312.048   1369.584     6.07    0.000     5528.718    11095.38
```

In this test, the null hypothesis is maintained. The SE_{1990} explains about 32.4% of the variation in the ΔIc. The results are statistically significant at 95% level of certainty.

Test Equation 3.5: Shadow Economy variables.

$Null\ Hypothesis$: H_O : $\Delta Ic = SE_{2008}$

$Maintained\ Hypothesis$: H_1 : $\Delta Ic \neq SE_{2008}$

Test: Linear Regression 95% Confidence Level

Regress dependent variable ΔIc with independent variable SE_{2008}.

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  1,    34) =   30.49
       Model |  157117731     1   157117731            Prob > F      =  0.0000
    Residual |  175195416    34  5152806.35            R-squared     =  0.4728
-------------+------------------------------           Adj R-squared =  0.4573
       Total |  332313147    35  9494661.35            Root MSE      =    2270
       Dch3Ic |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        SE08 |  -175.2049   31.72893   -5.52   0.000    -239.6858   -110.7239
       _cons |   9243.678   1224.261    7.55   0.000     6755.681    11731.68
```

The null hypothesis is rejected, and the temporary conclusion is that 45.73% of the variation in the ΔIc can be attributed to the variations in the SE_{2008}. With a t-value of -5.52, an F-score of 30.49, and 35 degrees of freedom, this test passes the 2-t Rule of Thumb, and the negative sign is the anticipated correct sign.

Educational Expenditure data for the SET

Test Equation 4: EE Data Validity; Comparing the means of the Set to the Mean of the Sample

Set

Recall that pre-test EE uses the average EE from 1980 to 1988, and the post-test EE uses

the average EE from 1998 to 2007. An un-paired t-test compares the variances using a ratio.

Null Hypothesis: H_O : Mean Ave EE of set $\neq$ Mean Ave EE SET

Maintained Hypothesis: H_1 : Mean Ave EE of set $=$ Mean Ave EE SET

Test: Two-Sample Unpaired t-test 99.9% Confidence Level

Compare the Mean of the Ave EE Set to EE SET.

```
Variable |     Obs        Mean     Std. Err.    Std. Dev. [99.9% Conf. Interval]
---------+-----------------------------------------------------------------------
AVE EE SET|      19     15.65927    1.678358    7.315792    9.077346     22.2412
AVE EE Set      152     14.07912    .4289228    5.288115     12.6396    15.51863
---------+-----------------------------------------------------------------------
combined |      171     14.25469    .4240829    5.545604    12.83457    15.67481
---------+-----------------------------------------------------------------------
    diff |              1.580154    1.347941                -2.934134    6.094442
-------------------------------------------------------------------------------
    diff = mean(AVE EE SET) - mean(AVE EE Set)                      t =    1.1723
Ho: diff = 0                                            degrees of freedom =     169

    Ha: diff < 0                   Ha: diff != 0                    Ha: diff > 0
 Pr(T < t) = 0.8786          Pr(|T| > |t|) = 0.2427          Pr(T > t) = 0.1214
```

In this case, the null hypothesis is maintained. The report above maintain that there is a

.87% probability that the true average of the EE for the SET et is less than the Total Set, and

.1214% chance that it is greater than the average of the Total Set, yet still, it remains well within

the acceptance area for the null hypothesis. The temporary conclusion is that the SET variance

average represents the Total Set variance average for each at 99.9% confidence level (given that

the Educational Expenditure of the Total Set is reliable (EdStats, 2010j; 17)). Further, that the

sample set of data from the Central and Eastern European countries are valid, and that we can at-

tempt to measure the degree of change in the Education Expenditures.

New Variables

Equation: $Ic_1 + Ic_2 = Ic_3$.

For example, the Official GDP_{1990} in Ukraine was $243.35 billion in US equivalent dollars. The 16.3% SE_{1990} was $39.66 billion, for a Total GDP_{1990} of $283.01 billion. The equation for $Ic_{3\ 1990}$ is $4,716 $Ic_{1\ 1990}$ + $769 $Ic_{2\ 1990}$ = $5,485 in equivalent US dollars per capita. Stated otherwise, the official data say that the Ukrainian people earn $4,716 US equivalent dollars per person, but the SE makes up 16.3% of the total economy. Therefore, Ukrainians actually earn $5,485 US equivalent dollars.

Equation: Example: $EE_{1\ Ukraine}$ + $EE_{2\ Ukraine}$ = $EE_{3\ Ukraine}$

15.95% $_1$of GE + - (16.3% SE × 15.95% GE)$_2$= 13.7145$_3$% of GE

Alternate Equation, in US $Billions:

$$\frac{15.95\% \text{ of GE} \times \$243.35 \text{ GDP}_1}{\$243.35 \text{ GDP}_1 + (16.3\% \times \$243.35 \text{ GDP}_1)} = \frac{\$3,881.43 \text{ GE}_1}{\$243.35 \text{ GDP}_1 + \$39.661 \text{ GDP}_2} = \frac{\$3,881.43 \text{ GE}_1}{\$283.01 \text{ GDP}_3}$$

= 13.7148% of GDP_3 Expenditures

Otherwise stated, the official figure for EE is 15.95% of government spending. However, since the SE effectively keeps 16.3% of the potential government revenue out of the government budgets, the official number is overstated, and education actually gets to spend, all else equal, 13.7148% of the GE budget. The SE is keeping for its use about $750 per Ukrainian citizen per year, given the policy is to invest 15.95% of its expenditure budget into public education.

Regional Data Comparison for Sample Set Validity

Research Question 1

Research Question 1.1: Are the HDI and the change in the Income per capita correlated at .5 or higher? To test this construct with our data, we can run the correlation coefficient test. If we reject the null hypothesis, then we can conclude for now, that the correlation between the Human Development Index from 1990 to 2008 and the change in income per capita, adjusted for SE, (Ic_3), is less than .5, consistent with the rule used in Wong, (2007b).

Hypothesis 1.1: The correlation coefficient of ΔIc_3 from 1990 to 2008 and ΔHDI from 1990 to 2008 is less than .5.

Equation 1.1

Null Hypothesis: H_O : $if\ |t|\ \geq t_{\frac{\alpha}{2},n-2}: reject\ H_O$

Maintained Hypothesis: H_1 : $if\ |t|\ < t_{\frac{\alpha}{2},n-2}: fail\ to\ reject\ H_O$

The correlation coefficient is .2495, which is significantly less than the benchmark of .5. On a one-tailed test, the t-statistic is -.501, well within the acceptance region of $< .1697$ at 30 degrees of freedom at the 95% confidence level. For now, we maintain that the correlation between the change in the HDI is correlated with the change in Ic3, but at .2495, the degree of association is weak. Below, the scatter graph shows the weak correlation.

To test the correlation between the Life Expectancy Index and the Educational Attainment Index, equally weighted (the weights in the HDI are equally weighted), we take the GDP index out, and re-run the correlation coefficient.

Hypothesis 1.2: The correlation coefficient of ΔIc_3 from 1990 to 2008 and ΔHDI component indices, $\Delta LEI + EAI$ from 1990 to 2008 is less than .5.

Equation 1.2

Null Hypothesis: H_O : $if\ |t|\ \geq t_{\frac{\alpha}{2},n-2}: reject\ H_O$

Maintained Hypothesis: H_1 : $if\ |t|\ < t_{\frac{\alpha}{2},n-2}: fail\ to\ reject\ H_O$

The correlation coefficient is .0015, which is significantly less than the benchmark of .5. On a one-tailed test, the t-statistic is -.501, well within the acceptance region of $< .1697$ at 30 degrees of freedom at the 95% confidence level. For now, we maintain that the correlation between the change in the HDI is very slightly negatively correlated with the change in Ic3, at -.0015. Below is the scatter graph depicting the correlation between the Change in Income per Capita and the life expectancy and educational attainment indices.

Research Question 2

Does governance corruption negatively affect Individual Income? (Governance corruption is measured by the average Shadow Economy from 2000-2008, and Education expenditure is measured with the proxy EEc_3, which includes the effect of the shadow economy on the total government expenditures). A linear regression comparison of the R^2 tests Research Question 2, using ΔIc_3 as the dependent and HDI_{1990} as the independent variable. HDI_{1990} is the pre-test or legacy measure, the starting point in human development measurements, for the Sample Set.

Hypothesis 2: The adjusted R^2 resulting from a linear regression of HDI against the ΔIc_3 is higher than the adjusted R^2 resulting from a linear regression of HDI and SE_{2008} against the ΔIc_3.

Equation 2.1

Null Hypothesis: H_O : $\Delta Ic_3 \neq HDI_{1990}$

Maintained Hypothesis: H_1 : $\Delta Ic_3 = HDI_{1990}$

Test: Linear Regression 95% Confidence Level

Regressed dependent variable ΔIc_3 using independent variable HDI_{1990}

```
      Source |       SS           df       MS                  Number of obs =        36
-------------+------------------------------                   F(  1,     34) =    49.83
       Model |   197539878         1    197539878              Prob > F        =   0.0000
    Residual |   134773269        34   3963919.67              R-squared       =   0.5944
-------------+------------------------------                   Adj R-squared   =   0.5825
       Total |   332313147        35   9494661.35              Root MSE        =     1991


------------------------------------------------------------------------------
      ch3tic |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hdi90 |   36596.02   5184.047     7.06   0.000     26060.77    47131.27
       _cons |  -26219.57   4126.185    -6.35   0.000    -34604.99   -17834.15
```

Post-Estimation Statistics for Regression

White's test for Ho: homoscedasticity
  against Ha: unrestricted heteroscedasticity
    chi2(2)= 12.49
  Prob > chi2=   0.0019

Cameron & Trivedi's decomposition of IM-test

```
            Source |      chi2     df       p
-------------------+-----------------------------
 Heteroskedasticity |     12.49      2     0.0019
          Skewness |      7.16      1     0.0075
          Kurtosis |      1.35      1     0.2460
-------------------+-----------------------------
             Total |     21.00      4     0.0003
```

Information Criteria

```
Model |   Obs    ll(null)   ll(model)     df          AIC          BIC
------+----------------------------------------------------------------
    . |    36    -339.767   -323.5223      2     651.0447     654.2117
```

The regression output shows a high *F*-score at 49.83 with 35 degrees of freedom, at most, 58.25% of the variation in the ΔIc_3 can be explained by the variation in the pre-test HDI, and the *t*-value of the HDI relationship is very significant at 7.06. This test passes the "*2-t* Rule of Thumb." The RMSE is 1991. "The minimum MSE criterion consists in choosing an estimator whose MSE is the least in a competing set of estimators…there is a trade-off involved – to obtain minimum variance, you may have to accept some bias" (Gujarati & Porter, 2009, p. 828). White's test confirms autocorrelation with X^2 of 12.49 on 2 degrees of freedom. The IM-test confirms highly left skewed data at 7.16 and a slightly short and fat (platykurtic) kurtosis distribution at 1.35. The AIC is 651.0447. The analysis suggests rejecting the null hypothesis, confirming a significant relationship. The next test is a comparison of the R^2 values between this equation and a second equation adding SE_{2008} as an explanatory variable.

Equation 2.2

Null Hypothesis:

$H_O : R^2$ regress ΔIc_3 with $HDI_{1990} \geq R^2$ regress ΔIc_3 with HDI_{1990} and SE_{2008}

Maintained Hypothesis:

$H_1 : R^2$ regress ΔIc_3 with $HDI_{1990} < R^2$ regress ΔIc_3 with HDI_{1990}, SE_{2008}

206

Test: Linear Regression95% Confidence Level

Regressed dependent variable ΔIc_3 using independent variables HDI_{1990} and SE_{2008}.

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  2,    33) =   33.80
       Model |  223306328      2   111653164           Prob > F      =  0.0000
    Residual |  109006819     33  3303236.93           R-squared     =  0.6720
-------------+------------------------------           Adj R-squared =  0.6521
       Total |  332313147     35  9494661.35           Root MSE      =  1817.5


------------------------------------------------------------------------------
      ch3tic |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hdi90 |    26579.5   5937.794     4.48   0.000     14498.97     38660.03
        se08 |  -89.02451   31.87514    -2.79   0.009     -153.875    -24.17404
       _cons |  -15005.97   5505.278    -2.73   0.010    -26206.54    -3805.401
```

Post-Estimation Statistics for Regression

> White's test for Ho:homoscedasticity
> against Ha:unrestricted heteroscedasticity
>   chi2(5) = 12.09
>   Prob > chi2= 0.0336

Cameron & Trivedi's decomposition of IM-test

```
            Source |      chi2     df       p
-------------------+----------------------------
 Heteroskedasticity |     12.09      5     0.0336
          Skewness |      6.49      2     0.0389
          Kurtosis |      2.01      1     0.1560
-------------------+----------------------------
             Total |     20.59      8     0.0083
```

Akaike's Information Criteria Score of the Model

```
Model |   Obs    ll(null)   ll(model)     df          AIC          BIC
------+-----------------------------------------------------------------
    . |    36    -339.767    -319.703      3      645.406     650.1566
```

The regression output shows a lower yet still very high *F*-score at 33.80 with 35 degrees of freedom, at most, 65.21% of the variation in the ΔIc_3 can be explained by the variation in the pre-test HDI, and both *t*-values HDI_{1990} and SE_{2008} variables are high and significant at 4.48 and -2.79. This test passes the *2-t* Rule of Thumb. The RMSE is lower at 1817.5. White's test rejects autocorrelation with X^2 of 12.09 on 5 degrees of freedom. The IM-test confirms a left skewed data at 6.49 and less platykurtic at 2.41. The AIC is lower, at 645.406, which is preferred to the higher in Equation 2.1 of AIC 651.0447. Akaike's Information Criteria (AIC) states that when

"comparing two or more models, the model with the lowest value of AIC is preferred" (p. 494). The analysis suggests rejecting the null hypothesis, confirming a significant relationship on the second equation.

A comparison of the R^2 test suggests rejecting the null hypothesis, and confirming for now that the R^2 of the augmented, second equation is higher, from 58.25% to 65.21%. In addition, the entire equation is more robust with a lower RMSE, lower AIC, less skewness, and no autocorrelation. The F-score, which is lower yet still very high, explains that the shape of the distribution is flatter. The rejected hypothesis suggests a temporary conclusion in favor of the SE_{2008} per country included in the regression with the HDI_{1990}, explains more of the variation in ΔIc_3 than does the HDI_{1990} alone. This finding would be consistent with the theory that corruption hinders economic development, and of the findings of Schneider, et al. (2010), Kauffmann, et al. (2008), Johnston, (2007), and other scholars.

Research Question 3

Does governance corruption negatively affect Education Expenditure? (Governance corruption is measured by the average Shadow Economy from 2000-2008, and Education expenditure is measured with the proxy EE_3). A linear regression tests the effects of corruption on EEc_3, by setting the change in EEc_3 (ΔEEc_3) as the dependent variable and the Shadow Economy in 2008, SE_{2008}, as the dependent variable.

Hypothesis 3: The variation in the ΔEEc_3 from 1990 to 2008 is not explained by the variation in SE_{2008}.

Equation 3

Null Hypothesis: $H_O : \Delta EEc_3 \neq SE_{2008}$

Maintained Hypothesis: $H_1 : \Delta EEc_3 = SE_{2008}$

Test: Linear Regression 95% Confidence Level

Regressed dependent variable $\$\Delta EEc_3$ using independent variable SE_{2008}.

```
    Source |       SS           df       MS              Number of obs =      36
-----------+----------------------------              F(  1,    34) =   13.17
     Model | 2374199.26       1  2374199.26            Prob > F      = 0.0009
  Residual |  6127530.8      34  180221.494            R-squared     = 0.2793
-----------+----------------------------              Adj R-squared = 0.2581
     Total | 8501730.06      35  242906.573            Root MSE      = 424.53
------------------------------------------------------------------------------
    $ΔEEc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------+----------------------------------------------------------------
      se08 | -21.53734   5.933854    -3.63   0.001    -33.59639   -9.478302
     _cons |  1080.751   228.9578     4.72   0.000     615.4524    1546.049
```

The test results suggest rejecting the null hypothesis, maintaining that the effects of the Shadow Economy on the change in Education Expenditures per person stated in dollars, SE_{2008} on $\$\Delta EEc_3$ are statistically significant. In addition, 25.81% of the variation in the change in Education Expenditures can be explained by variation in the Shadow Economy. The *F*-score is 13.17 with 35 degrees of freedom and the t-value is -3.63 for SE_{2008}. The RMSE is 424.53. This test passes the "2-t Rule of Thumb." Figure 4.3 shows the effects of the Shadow Economy on Education Expenditures. Figure 4.4 shows the effects of the Shadow Economy on Income per Capita.

Research Question 4

Do the pre-test HDI, governance corruption, and education expenditure explain the change in Income per capita? (Corruption is measured by the average Shadow Economy from 2000-2008, and Education expenditure is measured with the proxy EEc_3, which includes the effect of the shadow economy on the total government expenditures).

The null hypothesis asserts that there is no relationship between the $\$\Delta Ic_3$ and the explanatory variables, SE_{2008}, and the percentage of change between the EEc_3 pretest and the posttest values, $EEc3_{1990}$ and $EEc3_{2008}$. Gujarati, et al. explains and supports the practice of adding variables to seek higher degrees of significance and better over-all fit (2009, pp. 474-475).

Hypothesis 4.1: The variation in the $\$\Delta Ic_3$ from 1990 to 2008 is not explained by the variation in the HDI_{1990}, the SE_{2008} and the EEc_3 in $_{1990}$ and the EEc_3 in $_{2008}$.

Equation 4.1

Null Hypothesis: $H_O :\ \Delta Ic_3 \neq HDI_{1990} + SE_{2008} + EEc_{3\ 1990} + EEc_{3\ 2008}$

Maintained Hypothesis: $H_1 :\ \Delta Ic_3 = HDI_{1990} + SE_{2008} + EEc_{3\ 1990} + EEc_{3\ 2008}$

Test: Linear Regression 95% Confidence Level

Regress dependent variable $\$\Delta Ic3$ with independent variables HDI1990, SE2008, EEc31990, EEc3 2008.

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  4,    31) =   18.88
       Model |  235595046        4  58898761.6         Prob > F      =  0.0000
    Residual |   96718101       31  3119938.74         R-squared     =  0.7090
-------------+------------------------------           Adj R-squared =  0.6714
       Total |  332313147       35  9494661.35         Root MSE      =  1766.3


------------------------------------------------------------------------------
       $Δ3Ic |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     HDI1990 |   30198.41   6916.631     4.37   0.000     16091.84    44304.97
        SE08 |  -69.00913   32.80825    -2.10   0.044     -135.922   -2.096266
      EE31990|  -105.0454   79.86971    -1.32   0.198    -267.9408    57.84992
      EE32008|   286.9724    149.392     1.92   0.064    -17.71452    591.6593
       _cons |  -20081.12   7128.202    -2.82   0.008    -34619.18   -5543.054
```

Post-Estimation Statistics for Regression

White's test for Ho: homoscedasticity
    against Ha: unrestricted heteroscedasticity
        chi2(14) =19.48
    Prob > chi2 =0.1475

Cameron & Trivedi's decomposition of IM-test

```
            Source |     chi2     df        p
--------------------+----------------------------
 Heteroskedasticity |    19.48     14    0.1475
           Skewness |     5.04      4    0.2830
           Kurtosis |     2.41      1    0.1205
--------------------+----------------------------
              Total |    26.93     19    0.1063
```

Ramsey RESET test using powers of the fitted values of $\Delta 3Ic$

    Ho: model has no omitted variables
    $F(3, 14)=6.08$
    Prob > F=0.0025

Akaike's Information Criteria Score of the Model

```
Model |   Obs    ll(null)   ll(model)     df          AIC          BIC
------+----------------------------------------------------------------
    . |    36    -339.767    -317.55        5      645.1001     653.0177
```

The regression output shows an *F*-score of 18.88 with 35 degrees of freedom, at most, 67.14% of the variation in the dollar change in total income per capita can be explained by the variation in the independent variables. The *t*-values are all significant. This test does not pass the "*2-t* Rule of Thumb" as both of the education expenditure *t*-scores are less than 2.0 (Gujarati & Porter, 2009). The RMSE is 1766.3. The White's General Test for Heteroscedasticity reports a critical X^2 value of 19.48 which exceeds the X^2 score of 14, and which means heteroscedasticity exists (p. 387). The IM-test confirms highly left skewed data at 5.04, and a slightly platykurtic at 2.41. The AIC is 645.1001. The analysis of the equation suggests rejecting the null hypothesis, confirming for now that a statistically significant relationship exists.

The results of this test suggest that after accounting for corruption in the figures for each country, the change in income per person over the 18-year test period is a function of the development starting point in 1990 (HDI_{1990}), the average level of corruption from 2000 to 2008

(SE_{2008}), and the percentage of the total expenditure budget set aside per person for public education in the pretest and posttest years (EEc_{1990} and EEc_{2008}). However interesting these results, substituting the change in EEc_3 over the test period, may yield more significant results, as this method equalizes the pretest or starting point by country, and is consistent with the treatment of the Income variable (Gujarati & Porter, 2009). (See Table: 4.1 in the Appendix).

Hypothesis 4.2: The variation in the $\$\Delta Ic_3$ from 1990 to 2008 is not explained by the variation in the HDI_{1990}, the SE_{2008} and the percent change in EEc_3 from 1990 to 2008.

Equation 4.2

Null Hypothesis: H_O : $\$\Delta Ic_3 \neq HDI_{1990} + SE_{2008} + \%\Delta EEc_3$

Maintained Hypothesis: H_1 : $\$\Delta Ic_3 = HDI_{1990} + SE_{2008} + \%\Delta EEc_3$

Test: Linear Regression 95% Confidence Level

Regressed dependent variable $\$\Delta Ic_3$ using independent variables HDI_{1990}, SE_{2008} and $\%\Delta EEc_3$

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  3,    32) =   24.66
       Model |  231974312        3  77324770.5         Prob > F      =  0.0000
    Residual |  100338836       32  3135588.62         R-squared     =  0.6981
-------------+------------------------------           Adj R-squared =  0.6698
       Total |  332313147       35  9494661.35         Root MSE      =  1770.8
--------------------------------------------------------------------------------
       Dch3Ic |      Coef.   Std. Err.       t    P>|t|     [95% Conf. Interval]
-------------+------------------------------------------------------------------
     HDI1990 |   25815.11    5803.391     4.45   0.000     13993.99    37636.23
        SE08 |  -79.11753     31.6222    -2.50   0.018    -143.5298   -14.70522
       CH3EEc |   889.5726    535.0346     1.66   0.106    -200.2573    1979.402
       _cons |   -15091.7    5364.002    -2.81   0.008    -26017.81    -4165.58
```

Post-Estimation Statistics for Regression

White's test for Ho: homoscedasticity
        against Ha: unrestricted heteroscedasticity
          chi2(9)=14.27
       Prob > chi2=0.8034

Cameron & Trivedi's decomposition of IM-test

```
             Source |      chi2     df       p
--------------------+----------------------------
 Heteroskedasticity |     14.27      9     0.1130
           Skewness |      7.98      3     0.0464
           Kurtosis |      0.52      1     0.4702
--------------------+----------------------------
              Total |     22.77     13     0.0445
```

Ramsey RESET test using powers of the fitted values of Δ3Ic

  Ho: model has no omitted variables
      F(3, 15) = 5.50
      Prob > F= 0.0041

Akaike's Information Criteria Score of the Model

```
Model |   Obs    ll(null)   ll(model)    df         AIC          BIC
-------------+------------------------------------------------------------
    . |    36    -339.767   -318.2116     4      644.4232     650.7572
```

    The regression output shows an *F*-score of 24.66 with 35 degrees of freedom. At most, 66.98% of the variation in the change in the dollars per capita, $\$\Delta Ic_3$, can be explained by the variation in the independent variables. The *t*-values are all significant, however this test does not pass the "*2-t* Rule of Thumb" as the ΔEEc *t*-score is less than 2 at -1.66. The RMSE is 1770.8. The White's General Test for Heteroscedasticity reports a critical X^2 value of 14.27 which is greater than the X^2 score of 9, and which means heteroscedasticity is detected (Gujarati & Porter, 2009, pp. 386-397). The IM-test confirms highly left skewed data at 7.98 and a platykurtic at .52. The AIC is 644. The analysis suggests rejecting the null hypothesis, confirming for now, a statistically significant relationship.

    As anticipated, 4.2 yielded a higher degree of "goodness of fit" (p. 386) between the variation in the change in income and the variation in the independent variables. Testing 4.2 using the change in the percent of spending on education per capita, however, will tend to provide a skew in the results that captures bigness in the change due to the medium-sized economies *ability* to adopt change, and not necessarily a better picture of the goodness of fit. This can be seen in Table 4, on the graphic comparison of these four equations. (See Table: 4.2 in the Appendix).

Hypothesis 4.: The variation in the $\$\Delta Ic_3$ from 1990 to 2008 is not explained by the variation in the HDI_{1990}, the SE_{2008} and the change in EE_3 from1990 to 2008.

Equation 4.3

Test: Linear Regression 95% Confidence Level

Regressed dependent variable $\$\Delta Ic_3$ using independent variables HDI_{1990}, SE_{2008} and $\$\Delta EE_3$

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  3,    32) =   22.69
       Model |  226036995     3  75345665.1            Prob > F      =  0.0000
    Residual |  106276152    32  3321129.75            R-squared     =  0.6802
-------------+------------------------------           Adj R-squared =  0.6502
       Total |  332313147    35  9494661.35            Root MSE      =  1822.4


-------------------------------------------------------------------------------
      $Δ3Ic |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     HDI1990 |   25958.14    5993.159    4.33   0.000     13750.47     38165.8
        SE08 |  -81.43262     33.0398   -2.46   0.019    -148.7325   -14.13275
       $Δ3EE |    .017643    .0194572    0.91   0.371     -.02199    .0572759
       _cons |  -14916.48     5521.05   -2.70   0.011     -26162.5   -3670.474
```

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
 against Ha:unrestricted heteroscedasticity
    chi2(9)=25.39
        Prob > chi2=0.0026

Cameron & Trivedi's decomposition of IM-test

```
            Source |      chi2     df       p
-------------------+----------------------------
 Heteroskedasticity |     25.39      9    0.0026
           Skewness |     10.37      3    0.0157
           Kurtosis |      0.96      1    0.3283
-------------------+----------------------------
             Total |     36.72     13    0.0005
```

Ramsey RESET test using powers of the fitted values of $\Delta 3Ic$
        Ho: model has no omitted variables
        F(3, 15)=3.79
        Prob > F=0.0207

Akaike's Information Criteria Score of the Model

```
Model|Obsll(null)    ll(model)     dfAICBIC
------------------------------------------------------------------
    . |36    -339.767    -319.24644646.4927652.8268
```

The regression output shows a high *F*-score at 22.69 with 35 degrees of freedom, at most, 65.02% of the variation in the $\$\Delta Ic_3$ can be explained by the variation in the independent variables, and the *t*-values are all significant. This test does not pass the "*2-t* Rule of Thumb" as the change in the total education expenditures dollars per country, $\$\Delta EE_3$, *t*-score is less than 2 at .91 (Gujarati & Porter, 2009). The RMSE is 1822.4. The White's General Test for Heteroscedasticity reports a critical X^2 value of 25.39 which greater than the X^2 score of 9, and which means heteroscedasticity exists (pp. 386-397). The IM-test confirms left skewed data at 10.37 and a platykurtic at .96. The AIC is 646.4927. The analysis of the equation suggests rejecting the null hypothesis and confirming for now that a statistically significant relationship exists.

Testing this equation using the change in the dollars spent, however, will tend to provide a skew in the results that captures bigness in the available budget due to the larger economy, and not necessarily a better picture of the goodness of fit. This can be seen in Table 4, on the graphic comparison of these four equations. (See Table: 4.3 in the Appendix).

Hypothesis 4.4: The variation in the $\$\Delta Ic_3$ from 1990 to 2008 is not explained by the variation in the HDI_{1990}, the SE_{2008} and the dollar change in EEc_3 per capita from 1990 to 2008.
Equation 4.4

Null Hypothesis: H_O : $\$\Delta Ic_3 \neq HDI_{1990} + SE_{2008} + \$\Delta EEc_3$

Maintained Hypothesis: H_1 : $\$\Delta Ic_3 = HDI_{1990} + SE_{2008} + \$\Delta EEc_3$

Test: Linear Regression 95% Confidence Level

Regressed dependent variable ΔIc_3 using independent variables HDI_{1990}, SE_{2008} and $\$\Delta EEc3$

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  3,    32) =   81.38
       Model |  293803978       3  97934659.2           Prob > F      =  0.0000
    Residual |  38509169.7     32  1203411.55           R-squared     =  0.8841
-------------+------------------------------           Adj R-squared =  0.8733
       Total |  332313147      35  9494661.35           Root MSE      =    1097


------------------------------------------------------------------------------
       Dch3Ic |      Coef.   Std. Err.       t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     HDI1990 |   16384.67   3823.468      4.29   0.000     8596.518    24172.82
        SE08 |  -44.14497   20.11301     -2.19   0.036    -85.11383   -3.176101
      DCH3EEc |   3.618593   .4727804      7.65   0.000     2.655571    4.581615
       _cons |  -9615.573   3396.708     -2.83   0.008    -16534.44   -2696.706
```

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
against Ha:unrestricted heteroscedasticity
      chi2(9)=8.73
    Prob > chi2 =0.4624

Cameron & Trivedi's decomposition of IM-test

```
              Source |       chi2     df       p
---------------------+---------------------------
 Heteroskedasticity |       8.73      9     0.4624
            Skewness |       6.33      3     0.0964
            Kurtosis |       0.06      1     0.8014
---------------------+---------------------------
               Total |      15.13     13     0.2993
```

Ramsey RESET test using powers of the fitted values of $\Delta 3Ic$
    Ho: model has no omitted variables
        F(3, 16)=1.38
        Prob > F=0.2695

Akaike's Information Criteria Score of the Model

```
       Model |    Obs   ll(null)   ll(model)     df         AIC         BIC
-------------+----------------------------------------------------------------
           . |     36   -339.767   -300.9738      4    609.9475    616.2816
```

The regression output shows the highest measure of goodness of fit of the four equations

with an *F*-score of 81.38 and 35 degrees of freedom, at most, 87.33% of the variation in the $\$\Delta Ic3$

can be explained by the variation in the independent variables, and the *t*-values are all significant.

This test passes the "2-*t* Rule of Thumb" (Gujarati & Porter 2009). The RMSE is 1097, the low-

est of the four equations. The White's General Test for Heteroscedasticity reports a critical X^2 value of 8.73 which is smaller than the X^2 score of 9, and which means heteroscedasticity does not exist (pp. 386-397). The IM-test confirms left skewed data at 6.33 and a platykurtic at .06. The AIC is 609.9475. The analysis of the equation suggests rejecting the null hypothesis and confirming for now that a statistically significant relationship exists. (See Table: 4.4 in the Appendix).

Testing this equation using the change in the dollars spent per person, will tend to provide a skew in the results that underestimates spending in larger economies, and overestimates smaller economies possibly missing a variable such as efficiency or effectiveness in the education system. Equation 4.4 is the highest scoring equation in each of the categories. This can be seen on Table: 4.5 in the Appendix, which is the graphic comparison of these four equations.

Hypothesis 4.5: The variation in the $\$\Delta Ic3$ from 1990 to 2008 is not explained by the variation in the $HDI1990$, the $SE2008$, the dollar change in EEc3 per capita from1990 to 2008 and the Country Group.

Equation 4.5

Null Hypothesis: H_O : $\$\Delta Ic_3 \neq HDI_{1990} + SE_{2008} + \$\Delta EEc_3 + Group$

Maintained Hypothesis: H_1 : $\$\Delta Ic_3 = HDI_{1990} + SE_{2008} + \$\Delta EEc_3 + Group$

Test: Linear Regression 95% Confidence Level

Regressed variable ΔIc_3 using independent variables HDI_{1990}, SE_{2008}, $\$\Delta EEc3$, and Group

```
      Source |       SS       df       MS              Number of obs =      36
-------------+------------------------------           F(  4,    31) =   59.30
       Model |   293904763     4   73476190.8          Prob > F      =  0.0000
    Residual |    38408384    31   1238980.13          R-squared     =  0.8844
-------------+------------------------------           Adj R-squared =  0.8695
       Total |   332313147    35   9494661.35          Root MSE      =  1113.1


------------------------------------------------------------------------------
      $ΔIc3 |      Coef.   Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   HDI₁₉₉₀ |    16208.84   3928.236     4.13    0.000      8197.152    24220.53
   SE₂₀₀₈ |   -40.91068   23.34705    -1.75    0.090      -88.5273    6.705943
    $ΔEEc3 |    3.581477   .4970541     7.21    0.000      2.567729    4.595226
      Group |    109.3131   383.2702     0.29    0.777     -672.3716    890.9979
       _cons |   -9775.285   3491.734    -2.80    0.009     -16896.72   -2653.846
```

217

Post-Estimation Statistics for Regression

White's test for Ho:homoscedasticity
against Ha:unrestricted heteroscedasticity
chi2(14)   =   13.01
Prob > chi2=   0.5256

Cameron & Trivedi's decomposition of IM-test

```
             Source |      chi2     df       p
--------------------+---------------------------
 Heteroskedasticity |     13.01     14    0.5256
           Skewness |      5.35      4    0.2535
           Kurtosis |      0.06      1    0.7995
              Total |     18.42     19    0.4944
```

Ramsey RESET test using powers of the fitted values of $\$\Delta Ic3$
Ho: model has no omitted variables
F(3, 28) =   1.42
Prob > F =   0.2564

Akaike's Information Criteria Score of the Model

```
Model |   Obs    ll(null)   ll(model)      df          AIC          BIC
------+-----------------------------------------------------------------
    . |    36    -339.767   -300.9266       5     611.8532     619.7708
```

The regression output shows the second highest measure of goodness of fit of the four

equations with an *F*-score of 59.3 and 35 degrees of freedom, at most, 86.99% of the variation in

the $\$\Delta Ic3$ can be explained by the variation in the independent variables, and the *t*-values are all

significant. This test does not pass the "2-*t* Rule of Thumb" for the Group or the Shadow Econ-

omy variables (Gujarati & Porter 2009). The RMSE is 1113.1. The White's General Test for

Heteroscedasticity reports a critical X^2 value of 13.01 which is smaller than the X^2 score of 14,

and which means heteroscedasticity does not exist (pp. 386-397). The IM-test confirms left

skewed data at 5.35 and a platykurtic at .06. The AIC is 611.85. The analysis of the equation

suggests rejecting the null hypothesis and confirming for now that a statistically significant rela-

tionship exists.

Adding the Country Group to the equation tended to absorb the skewness in the results

and the significance of the Shadow Economy, possibly suggesting that the Country Group may

approximate the degree of the Shadow Economy of a country in this sample set. Table: 4.5 in the Appendix, is the graphic comparison of these equations. Table 5.1 in the Appendix provides the Correlation Coefficient for the variables. The Country Group degree of association with the Total Change in Income per Capita is 0.6549, with the HDI in 1990 is 0.5661, with the Education Expenditure is 0.5648, and with the Shadow Economy in 1990 is -0.6958.

The widely accepted method for determining the factors of economic growth is the OLS linear regression, (*e.g.,* Sachs and Werner (1995) *Economic Convergence and Economic Policies*, Gupta et al., (1998) *Does Corruption Affect Income Inequality and Poverty?*). However, the structural equation method appears in important articles since 1984, where Frey and Weck-Hannemann (1984) apply the MIMIC method used in psychometrics starting in the 1970s in *The Hidden Economy as an "Unobserved" Variable*, and Sachs and Werner (1997) apply the Two-Stage Least Squared method in *Fundamental Sources of Long-Run Growth*.

The relatively new body of literature delineating corruption from the underground – or shadow, parallel, off the books, non-observed – economy makes use of the complex and relatively new *structural equation* approach or MIMIC model, which stands for Multiple Indicator Multiple Cause. "The idea is to represent the output (or income) of the underground economy as a latent variable or index, which has causes and effects that are observable but which cannot itself be directly measured" (Breuch, 2005, p. 1).

Thus, there are two kinds of 2 observed variables in the model, "causal" variables and "indicator" variables, which are connected by a single unobserved index. Values of the index over time are inferred from data on causes and indicators by estimating the statistical model and predicting the index. The fitted index is then interpreted as a time-series estimate of the magnitude of the underground economy. Usually the measure is hidden output or income as a percentage of recorded GDP, although some researchers are concerned with the "tax gap" between actual revenue and the potential revenue when all taxable income is reported (p. 1).

219

Critics of the MIMIC method cite instability in the findings with minor changes in the period or the countries studied, the absence of important economic, political, or social influences in the embodied in the variables, and the reliance on multiple and different variables for each equation (p. 2). While employing a simultaneous equation method would allow us to solve for the effects of the shadow economy on both income and education in isolation and together and potentially report preliminary information on causality, this thesis' relatively simple data set tested using the complex MIMIC method is be beyond the scope of this thesis and possibly of the available data.

The Two Stage Least Squared method (2SLS), however, is within the possibilities of methods useful to this thesis and potentially helpful given that the variables are endogenous, and likely correlated with the error term, violating the rules of OLS regression assumptions with bias in the test results (Nagler, 1999). From Leigh and Schimbri (2004, p. 286-7) comes the logic offered in the following discussion regarding the 2SLS method. To estimate the causal effect of the Shadow Economy on Income per Capita, we can use an instrument, which affects Income only through its effect on the Shadow Economy. Correlation between Income and the Shadow Economy does not imply that the Shadow Economy causes lower Income because other variables, such as regime changes or armed conflicts, may affect both Income and the Shadow Economy. In addition, Income may affect the Shadow Economy in addition to the Shadow Economy causing changes in Income, in a cyclical relationship. To attempt to estimate the causal effect of the Shadow Economy on Income from the sample data, we use the Education Expenditures as an instrument for the Shadow Economy in an Income regression. If Education Expenditures only affect Income per Capita because it affects the Shadow Economy (ceteris paribus), correlation between Education Expenditures and Income is evidence that Shadow Economy causes changes in Income. An estimate of the effect of the Shadow Economy on Income can be made by also making use of the correlation between Education Expenditures and the Shadow Economy patterns.

Research Question 4.6

The null hypothesis asserts that there is no significant relationship between the level of Individual Income$_3$ in 2008 (Ic$_3$08) and the explanatory variables, HDI1990, SE08, and the level of Education Expenditures per Capita in 2008 (EE$_3$08Dc)

Hypothesis 4.6: The variation in the Ic$_3$08 is not explained by the variation in the HDI1990, the SE08, and the level of EEc$_3$08Dc.

Equation 4.6

Null Hypothesis: H_O : Ic$_3$08 $\neq$ HDI1990 + SE08 + EE$_3$08Dc

Maintained Hypothesis: H_1 : Ic308 = HDI1990 + SE08 + EE308Dc

Following is the STATA output for the single equation instrumental variables 2SLS regression equation reporting small sample results that are adjusted for the degrees of freedom. In the first stage, Education Expenditures per Capita in 2008 are the dependent variable. The Shadow Economy in 2008 and the Human Development Index in 1990 are the independent variables. The second stage sets Individual Income in 2008 as the dependent variable, and the employs the independent variables in the first stage as instrumental variables and tests their joint effect along with Education Expenditures on Individual Income.

Test: ivregress 2sls Ic32008 SE08 (EE308Dc = HDI1990), first small

```
First-stage regressions                    Number of obs   =          36
                                            F(   2,    33) =       26.77
                                            Prob > F        =      0.0000
                                            R-squared       =      0.6187
                                            Adj R-squared   =      0.5956
                                            Root MSE        =    667.8208
------------------------------------------------------------------------------
    EE308Dc |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
       SE08 |  -26.1214   11.70901    -2.23   0.033    -49.94357   -2.299236
    HDI1990 |  9073.607   2155.828     4.21   0.000     4687.542    13459.67
      _cons |  -5219.72   1999.873    -2.61   0.014    -9288.493   -1150.948
```

Instrumental variables (2SLS) regression (with adjustments to the degrees of freedom on a small sample)

```
      Source |       SS           df       MS                 Number of obs =       36
-------------+------------------------------              F(  2,    33) =  162.38
       Model |  2.8105e+09      2  1.4052e+09              Prob > F      =  0.0000
    Residual |   215380231     33  6526673.65              R-squared     =  0.9288
-------------+------------------------------              Adj R-squared =  0.9245
       Total |  3.0258e+09     35  86452635.7              Root MSE      =  2554.7


------------------------------------------------------------------------------
     Ic32008 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      EE308Dc |   9.329588   .9089084     10.26   0.000      7.4804     11.17878
        SE08 |  -7.666987    62.0813     -0.12   0.902    -133.9723     118.6384
       _cons |   -743.211   3103.729     -0.24   0.812    -7057.795     5571.373
```

Instrumented: EE308Dc, Instruments: SE08 HDI1990

Instrumental variables (2SLS) regression (without adjustments)
```
              Number of obs =       36
                                                       Wald chi2(2)  =   354.29
                                                       Prob > chi2   =   0.0000
                                                       R-squared     =   0.9288
                                                       Root MSE      =     2446


------------------------------------------------------------------------------
     Ic32008 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      EE308Dc |   9.329588   .8702136     10.72   0.000      7.624001    11.03518
        SE08 |  -7.666987   59.43832     -0.13   0.897    -124.1639      108.83
       _cons |   -743.211   2971.594     -0.25   0.803    -6567.428     5081.006
```

The regression output shows a high *F*-score at 26.77 with 35 degrees of freedom, at most, 59.56% of the variation in the Education Expenditures per capita in 2008 is explainable by the variation in the Shadow Economy on average from 2000-2007 and the Human Development Index 1990, at the 95% confidence level. The signs are correct. This test does not pass the "2-t Rule of Thumb" as the combined t-score of the Shadow Economy 08 and the HDI 1990 on Education Expenditures per Capita in 2008 is less than 2, at -0.12 (Gujarati & Porter 2009). The test results suggest that Individual Income in 2008 is a function of Education Expenditures, both of which are affected by the Shadow Economy, and both the Income and Education variables are affected by the initial level of Human Development. This methodological option suggests a causal relationship from the HDI 1990 level and Shadow Economy percentage toward the Education Expenditures and Income variables. The analysis of the equation suggests rejecting the null hy-

pothesis and confirming for now that a statistically significant and causal relationship exists between the independent variables, HDI1990, the Shadow Economy in 2008, and Education Ex-Expenditures in 2008; on Individual Income in 2008.

However, the high Wald-Wolfowitz score of 354.29, along with the Hausman test of Endogeneity that shows a significant coefficient of the EE308Dc in the second stage with a high t-score of 10.72 suggests that the new variables are not independent (p. 705).

In *Notes on Simultaneous Equations and Two Stage Least Squares Estimates*, Nagler (1999, p. 7) cautions the researcher about shortcomings of the 2SLS estimates; consistent results require large samples, the B_1 will be consistent but asymptotic to infinity toward zero, and therefore, will not be unbiased. If one considers the sample set to be relatively small, n=36, and considers that the 2SLS method may report inconsistent B_1 results which may be (diminishing marginally) biased, it may be less attractive a method option than is OLS as the simplest method is desirable. However, we decide against the simultaneous equation option at the expense of the preliminary information on causality (Gujarati & Porter 2007, p. 96). Further analysis may yield a more telling decision rule.

The most common method found in the literature on the effects of corruption and the determinants of economic growth is, by far, the Ordinary Least Squared (OLS) linear regression. An important example of its use is found in Gupta, Davoodi, and Alonso-Term (1998). *Does Corruption Affect Income Inequality and Poverty?* International Monetary Fund Working Paper, 98(76), 1-41. The benefits of a linear regression include that we learn more about the relationships among and between several independent variables and a dependent variable in a simple model. In addition, we can 'control a variable' if we wish to balance the effect of that variable across variables - - so that we can minimize differences statistically - - and just study the relationship between the independent and the dependent variables. The limitations of regression techniques include three issues found here. (1) We can only deduce relationships and cannot be

sure about underlying causal mechanism. (2) Inherent in these techniques is the tendency toward closely to fully redundant variables, collinearity. (3) Violating the assumptions of normal distributions in the variance (and then in the standard errors), heteroscedasticity, may lead to bias in the inferences made from the resulting tests (Gujarati & Porter 2009).

Several tests that offer decision rules exist. Using the sample size decision rule, we would "reject the null hypothesis when the computed *F-value* exceeds the logarithm of the sample size (n=36 = *ln* 1.55), which it does in both the 2SLS and OLS equations, so neither method is favored based on the sample size decision rule. If one assumes that n=36 is relatively large sample size and employs the 2SLS equation, the decision rule falls to the tests for endogeneity. If the null hypothesis states that the variables are not endogenous, we would reject the null hypothesis in favor of the maintained hypothesis, that the variables are likely not independent, and opt for the OLS equation. According to Gujarati & Porter (p 828), "[i]n practice, the minimum MSE criterion is used when the best unbiased estimators are incapable of producing estimators with smaller variances" as seen in these examples. One would favor the OLS test results of a 2146.2 MSE over the 2SLS test results of a 2446 MSE, and accept the tradeoff of a smaller MSE, at the expense of some bias. Rather disregard the learning from 2SLS method, a researcher may employ other tests for causality; however, these may be best reserved for future study. For the purposes of this thesis, the OLS method is maintained as the best linear unbiased estimator (p. 422).

Test: Regress Ic32008 HDI1990 SE08 EE308Dc

```
      Source |       SS           df       MS              Number of obs =       36
-------------+----------------------------------           F(  3,    32) =   208.31
       Model |  2.8784e+09         3   959482690           Prob > F      =   0.0000
    Residual |  147394179         32   4606068.1           R-squared     =   0.9513
-------------+----------------------------------           Adj R-squared =   0.9467
       Total |  3.0258e+09        35   86452635.7          Root MSE      =   2146.2


------------------------------------------------------------------------------
     Ic32008 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     HDI1990 |   19501.72    8588.73     2.27   0.030      2007.052    36996.39
        SE08 |   -63.8092   40.36713    -1.58   0.124     -146.0344    18.41596
     EE308Dc |   7.180308    .5594332    12.83   0.000      6.04078    8.319836
       _cons |  -11961.85   7059.257    -1.69   0.100     -26341.09    2417.384
```

From Equation 4.4, the 2SLS method yields results consistent with those in Equation 4.6, and the same decision is made as was made in Equation 4.6; the OLS method remains the best linear unbiased estimator of Equation 4.4 using the minimum MSE decision rule.

The STATA command reads: Instrumental Variable 2SLS, where the first the Change in Total Education Expenditures per Capita from 1990 to 2008 stated in dollars is regressed against the average Shadow Economy from 2000 to 2008 and the Human Development Index in 1990.

Test: Inverse Regress 2sls Ic32008 HDI1990 (EE3ChDc = SE08), first

```
First-stage regressions                        Number of obs   =        36
                                                 F(  2,     33) =      9.80
                                                 Prob > F       =    0.0005
                                                 R-squared      =    0.3727
                                                 Adj R-squared  =    0.3347
                                                 Root MSE       =  402.0028


------------------------------------------------------------------------------
    EE3ChDc |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    HDI1990 |  2877.536   1297.727     2.22   0.034      237.2912    5517.78
       SE08 | -12.10331   7.048382    -1.72   0.095     -26.44335   2.236729
      _cons | -1544.868   1203.848    -1.28   0.208     -3994.114   904.3786

Instrumental variables (2SLS) regression         Number of obs =        36
                                                 Wald chi2(2)   =     68.08
                                                 Prob > chi2    =    0.0000
                                                 R-squared      =    0.6296
                                                 Root MSE       =      5580


------------------------------------------------------------------------------
    Ic32008 |     Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    EE3ChDc |  20.76861   8.083341     2.57   0.010      4.92555    36.61167
    HDI1990 |  24890.61   37032.29     0.67   0.501     -47691.35   97472.57
      _cons |  -17356.3   27202.64    -0.64   0.523     -70672.48   35959.89
```

Instrumented: EE3ChDc   Instruments: HDI1990 SE08

The STATA command that adjusts for the small sample size does not change the decision rule.

Test: ivregress 2sls Ic32008 HDI1990 (EE3ChDc = SE08), first small

First-stage regressions

```
                                        Number of obs   =         36
                                         F(  2,    33) =       9.80
                                         Prob > F       =     0.0005
                                         R-squared      =     0.3727
                                         Adj R-squared  =     0.3347
                                         Root MSE       =  402.0028


------------------------------------------------------------------------------
      EE3ChDc |     Coef.   Std. Err.       t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
      HDI1990 |  2877.536   1297.727     2.22   0.034     237.2912    5517.78
         SE08 | -12.10331   7.048382    -1.72   0.095    -26.44335   2.236729
        _cons | -1544.868   1203.848    -1.28   0.208    -3994.114   904.3786
```

Instrumental variables (2SLS) regression

```
      Source |       SS       df       MS              Number of obs =       36
-------------+------------------------------           F(  2,    33) =    31.20
       Model | 1.9049e+09     2   952464510            Prob > F       =   0.0000
    Residual | 1.1209e+09    33  33967067.5            R-squared      =   0.6296
-------------+------------------------------           Adj R-squared =   0.6071
       Total | 3.0258e+09    35  86452635.7            Root MSE       =   5828.1


------------------------------------------------------------------------------
      Ic32008 |     Coef.   Std. Err.       t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
      EE3ChDc |  20.76861   8.442775     2.46   0.019     3.591654   37.94556
      HDI1990 |  24890.61   38678.97     0.64   0.524    -53802.35   103583.6
        _cons |  -17356.3   28412.23    -0.61   0.545     -75161.4   40448.81
------------------------------------------------------------------------------
```

Instrumented: EE3ChDc   Instruments: HDI1990 SE08

Regress Ic32008 HDI1990 SE08 EE3ChDc

```
      Source |       SS       df       MS              Number of obs =       36
-------------+------------------------------           F(  3,    32) =    63.79
       Model | 2.5924e+09     3   864128087            Prob > F       =   0.0000
    Residual | 433457989     32  13545562.2            R-squared      =   0.8567
-------------+------------------------------           Adj R-squared =   0.8433
       Total | 3.0258e+09    35  86452635.7            Root MSE       =   3680.4


------------------------------------------------------------------------------
      Ic32008 |     Coef.   Std. Err.       t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
      HDI1990 |  57561.19   12735.36     4.52   0.000     31620.12   83502.26
         SE08 |  -137.417   67.35091    -2.04   0.050    -274.6063  -.2276653
      EE3ChDc |   9.41494   1.593722     5.91   0.000     6.168635   12.66125
        _cons | -34896.21   11293.16    -3.09   0.004    -57899.63  -11892.79
------------------------------------------------------------------------------
```

TABLES AND FIGURES

Table 1 Hypothesis 1 Data.

Name	Human Development Index 1990	Life Expectancy Index plus Educational Attainment Index	Change in the Human Development Index 1990 to 2008	Income per Capita in 2008	$ Change in Income per Capita from 1990 to 2008
Country	HDI1990	HDI2	HDI Ch	Ic 2008	IcCh $c
Armenia	0.73	111	150.70	1,520	725
Azerbaijan	0.76	109	142.91	2,131	880
Belarus	0.80	136	169.59	2,515	1,105
Estonia	0.82	153	186.75	7,114	3,291
Georgia	0.74	114	152.60	1,271	-222
Kazakhstan	0.78	110	140.04	2,380	768
Kyrgyzstan	0.69	109	158.05	379	-86
Latvia	0.80	153	189.60	6,036	2,135
Lithuania	0.83	155	185.97	6,032	1,741
Moldova	0.74	124	167.10	581	-248
Russian Federation	0.82	147	177.89	3,043	441
Tajikistan	0.64	106	165.50	245	-181
Turkmenistan	0.73	106	143.87	1,714	672
Ukraine	0.75	118	155.10	1,156	-231
Uzbekistan	0.69	110	158.86	840	155
Albania	0.78	104	131.52	1,825	847
Bosnia Herzegovina	0.80	119	146.87	2,223	-1,194
Bulgaria	0.80	131	162.41	2,661	991
Croatia	0.82	124	150.71	6,807	1,552
Czech Republic	0.85	158	185.65	7,593	2,257
Germany	0.90	184	203.80	25,547	6,119
Hungary	0.81	160	196.54	6,216	1,976
Macedonia	0.78	123	156.75	2,175	115
Mongolia	0.68	121	177.67	735	239
Montenegro	0.82	128	155.52	2,335	890
Poland	0.81	146	180.30	6,228	3,132
Romania	0.79	134	170.00	2,845	949
Serbia[Q]	0.80	124	154.03	328	-1,117
Slovakia	0.83	162	194.35	8,591	3,381
Slovenia	0.85	125	145.63	13,789	5,472
Average	0.78	130.02	165.21	4228.50	1218.49
Standard Deviation	0.06	20.85	18.87	5100.83	1702.22
Minimum	0.06	20.85	18.87	244.96	-1194.27
Maximum	0.90	183.50	203.80	25546.85	6119.18

Table 2 Hypothesis 2 Data.

Name	Human Development Index 1990	$ Change in Income per Capita from 1990 to 2008	Shadow Economy Ave as a percentage of GDP 2000-07
Country	HDI1990	IcCh $c	SE 2008
Armenia	0.731	724.55	48.70
Azerbaijan	0.755	880.49	63.30
Belarus	0.795	1105.22	49.80
Estonia	0.817	3291.29	40.30
Georgia	0.739	-221.71	68.80
Kazakhstan	0.778	768.37	45.30
Kyrgyzstan	0.687	-85.87	42.00
Latvia	0.803	2134.96	41.70
Lithuania	0.828	1741.07	31.90
Moldova	0.735	-248.10	45.80
Russian Federation	0.821	441.25	48.60
Tajikistan	0.636	-181.11	44.30
Turkmenistan	0.730	672.41	36.00
Ukraine	0.754	-230.75	53.90
Uzbekistan	0.687	154.85	37.93
Albania	0.784	846.86	36.30
Bosnia Herzegovina	0.803	-1194.27	34.60
Bulgaria	0.803	990.74	37.50
Croatia	0.817	1551.59	34.70
Czech Republic	0.847	2257.16	19.80
Germany	0.896	6119.18	16.10
Hungary	0.812	1975.51	25.80
Macedonia	0.782	115.24	36.20
Mongolia	0.676	239.23	37.90
Montenegro	0.815	889.86	39.67
Poland	0.806	3131.82	28.00
Romania	0.786	949.11	36.30
Serbia[Q]	0.797	-1116.71	39.67
Slovakia	0.827	3380.84	19.70
Slovenia	0.853	5471.62	28.00
Average	0.780	1218.49	38.95
Standard Deviation	0.058	1702.22	11.66
Minimum	0.058	-1194.27	11.66
Maximum	0.896	6119.18	68.80

Table 3 Hypothesis 3 Data.

Name	Shadow Economy Ave as a percentage of GDP 1989-99	Shadow Economy Ave as a percentage of GDP 2000-07	Dollars Spent on education per capita
Country	SE 1990	SE 2008	EEDc 2008
Armenia	40.300	48.70	252.07
Azerbaijan	45.100	63.30	227.73
Belarus	35.600	49.80	304.95
Estonia	34.300	40.30	1,094.55
Georgia	45.100	68.80	166.74
Kazakhstan	31.900	45.30	252.23
Kyrgyzstan	35.200	42.00	96.16
Latvia	25.700	41.70	1,554.71
Lithuania	26.000	31.90	983.42
Moldova	29.300	45.80	179.31
Russian Federation	27.800	48.60	320.32
Tajikistan	24.000	44.30	65.03
Turkmenistan	24.000	36.00	304.27
Ukraine	29.400	53.90	220.54
Uzbekistan	22.100	37.93	176.27
Albania	31.000	36.30	194.86
Bosnia Herzegovina	28.000	34.60	474.28
Bulgaria	27.100	37.50	297.04
Croatia	24.600	34.70	722.31
Czech Republic	13.100	19.80	707.96
Germany	12.200	16.10	2,397.18
Hungary	22.300	25.80	711.57
Macedonia	35.600	36.20	412.96
Mongolia	18.100	37.90	132.62
Montenegro	23.600	39.67	338.04
Poland	22.300	28.00	785.04
Romania	27.300	36.30	370.49
Serbia[Q]	23.600	39.67	46.02
Slovakia	15.100	19.70	971.98
Slovenia	22.900	28.00	1,791.24
Average	27.420	38.95	551.73
Standard Deviation	8.128	11.66	554.25
Minimum	8.128	11.66	46.02
Maximum	45.100	68.80	2,397.18

Table 4 Hypothesis 4 Data.

Name	Human Development Index 1990	Dollar Difference in Education Expenditures per Capita	Dollar Change Shadow Economy Dollar Value per Capita	Dollar Change in Official Income per Capita from 1990 to 2008	Dollar Change in Total Income per Capita from 1990 to 2008
Country	HDI1990	EED Ch/c	SED Ch	IcCh $c	IcT ChDc
Armenia	0.731	106.755	419.67	725	1144.21
Azerbaijan	0.755	-105.747	784.98	880	1665.47
Belarus	0.795	63.874	750.59	1105	1855.80
Estonia	0.817	119.845	1555.73	3291	4847.02
Georgia	0.739	58.304	201.29	-222	-20.41
Kazakhstan	0.778	-52.136	564.04	768	1332.41
Kyrgyzstan	0.687	-11.236	-4.45	-86	-90.32
Latvia	0.803	899.312	1514.47	2135	3649.43
Lithuania	0.828	102.591	808.55	1741	2549.62
Moldova	0.735	-45.103	23.17	-248	-224.93
Russian Federation	0.821	70.509	755.71	441	1196.96
Tajikistan	0.636	-59.929	6.26	-181	-174.85
Turkmenistan	0.730	49.037	367.07	672	1039.49
Ukraine	0.754	-117.112	215.34	-231	-15.41
Uzbekistan	0.687	19.885	167.13	155	321.98
Albania	0.784	86.530	359.23	847	1206.09
Bosnia Herzegovina	0.803	204.069	-187.67	-1194	-1381.94
Bulgaria	0.803	154.375	545.27	991	1536.01
Croatia	0.817	-260.356	1069.15	1552	2620.74
Czech Republic	0.847	-193.848	804.44	2257	3061.60
Germany	0.896	609.839	1742.87	6119	7862.04
Hungary	0.812	488.092	658.09	1976	2633.60
Macedonia	0.782	54.117	54.07	115	169.31
Mongolia	0.676	43.536	188.90	239	428.13
Montenegro	0.815	67.825	585.22	890	1475.08
Poland	0.806	407.315	1053.42	3132	4185.24
Romania	0.786	112.694	515.12	949	1464.24
SerbiaQ	0.797	-224.142	-210.83	-1117	-1327.54
Slovakia	0.827	91.391	905.71	3381	4286.55
Slovenia	0.853	452.178	1956.23	5472	7427.85
Average	0.780	106.415	605.63	1218.49	1824.12
Standard Deviation	0.058	248.685	558.00	1702.22	2225.02
Minimum	0.058	-260.356	-210.83	-1194.27	-1381.94
Maximum	0.896	899.312	1956.23	6119.18	7862.04

Figure 5 Shadow Economy MIMIC Diagram.

Business Regulations

Unemployment Rate

Transfers and Subsidies

Government Consumption

Government Effectiveness

Fiscal Freedom

Bureaucracy Costs

Rule of Law

Shadow Economy

Corruption

GDP Growth

Labor Force Participation

Ratio M0 to M1

Real GDP per Capita

Bribes

Judicial Independence

+   +/-   +   +   -   -   +   -   -   +/-   +   +/-   +/-   -   +   -
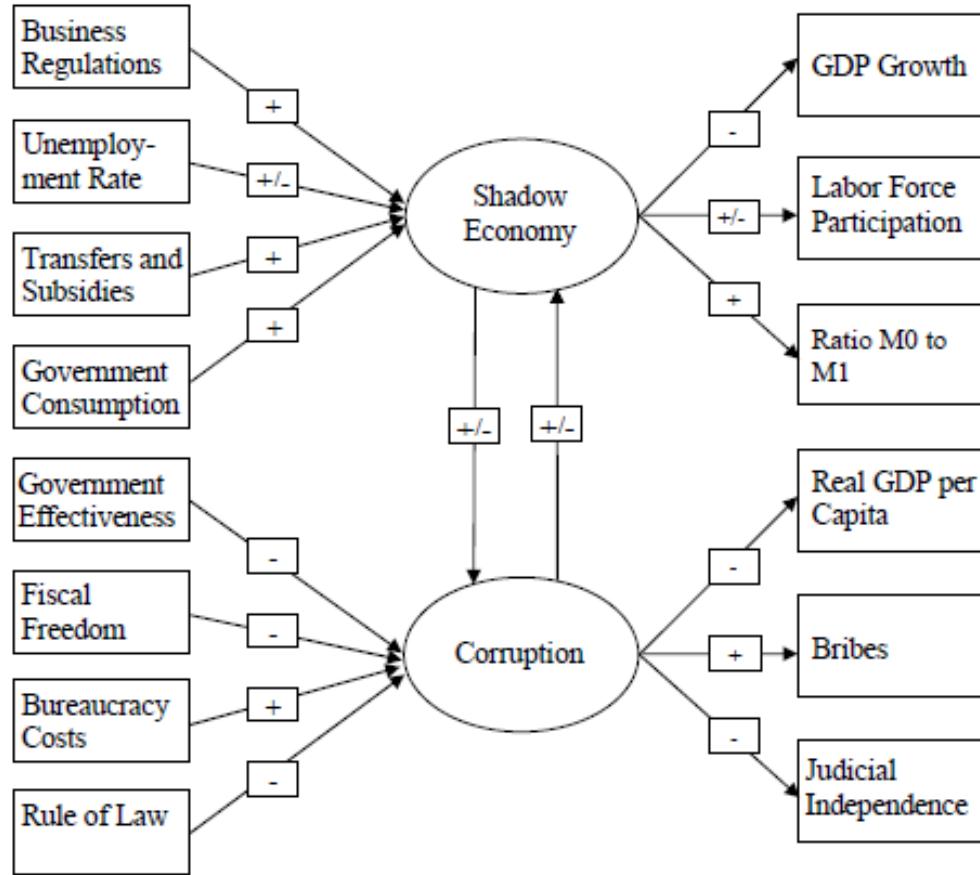
Figure 5 Shadow Economy MIMIC Model (Schneider, et al., 2010; Buehn, et al., 2009 Figure 3. Path Diagram; Breusch, Trevor, 2005).

Shadow Economy = $f\ (\ \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \mu_t\ )$, and	
Shadow Economy = $f\ (\ \beta_1 + \beta_6 X_{6t} + \beta_7 X_{7t} + \beta_8 X_{8t} + \mu_t\ )$	
Where causal variables are	Where Indicator variables are
X_2 = Business Regulation	X_6 = GDP Growth
X_3 = Uunemployment Rate	X_7 = Labor Force Participation
X_4 = Transfers and Subsidies	X_8 = Ratio of M0 to M1
X_5 = Government Consumption	
Corruption = $f\ (\ \beta_1 + \beta_{10} X_{10t} + \beta_{11} X_{11t} + \beta_{12} X_{12t} + \beta_{13} X_{13t} + \mu_t\ )$, and	
Corruption = $f\ (\ \beta_1 + \beta_{14} X_{14t} + \beta_{15} X_{15t} + \beta_{16} X_{16t} + \mu_t\ )$	
Where causal variables are	Where indicator variables are
X_{12} = Government Effectiveness	X_{16} = Real GDP per Capita
X_{13} = Fiscal Freedom	X_{17} = Bribes
X_{14} = Bureaucracy Costs	X_{18} = Judicial Independence
X_{15} = Rule of Law	

Figure 6 Shadow Economy Simultaneous Equations.

Table 5 GDP per Capita Cycle.

Gross Domestic Product per Capita from 1989 to 2008 for Central and Eastern Europe

Country Name	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Former USSR Countries																				
Tajikistan	440	426	387	270	222	172	149	122	122	127	130	139	152	164	179	195	206	217	231	245
Moldova		980	824	585	579	401	396	376	382	358	346	354	376	407	435	468	505	530	548	591
Kyrgyz Republic	448	465	422	359	304	243	227	240	260	261	267	279	291	289	306	324	321	327	353	379
Ukraine	1484	1387	1267	1141	978	758	670	609	596	590	594	636	701	745	822	928	960	1037	1126	1156
Georgia		1572	1249	698	502	458	478	540	605	632	658	678	720	769	867	920	998	1083	1219	1249
Russian Federation	2693	2602	2465	2106	1926	1686	1618	1564	1591	1511	1614	1775	1870	1968	2121	2285	2443	2654	2889	3043
Uzbekistan	690	685	667	579	553	514	500	499	515	528	543	558	574	590	608	647	684	725	783	840
Azerbaijan	1431	1251	1223	932	706	559	488	489	513	558	594	655	714	784	866	945	1183	1574	1946	2131
Turkmenistan	1062	1042	965	888	777	627	569	521	455	479	551	645	766	874	1008	1164	1297	1425	1572	1714
Latvia	4217	3901	3421	2349	2271	2356	2364	2477	2727	2904	3065	3302	3588	3854	4154	4539	5047	5695	6296	6036
Kazakhstan		1612	1425	1351	1235	1095	1023	1044	1078	1076	1116	1229	1397	1534	1671	1819	1978	2166	2332	2380
Lithuania	4291	4041	3185	2680	2435	2533	2685	2905	3149	3136	3267	3506	3759	4163	4493	4874	5287	5839	6032	5154
Armenia	795	709	420	392	423	462	497	520	562	584	621	683	775	883	976	1110	1255	1425	1520	1299
Belarus		1410	1392	1256	1158	1024	920	949	1062	1156	1200	1273	1338	1412	1519	1701	1844	2046	2255	2515
Estonia	4116	3822	3535	2837	2744	2756	2946	3138	3517	3742	3766	4144	4480	4858	5230	5680	6271	6985	7493	7114
Former Yugoslavia																				
Serbia	5339	5211	1302	942	650	663	703	761	844	860	766	809	856	890	914	992	1050	1110	1191	1262
Macedonia	2059	1919	1782	1641	1604	1578	1589	1603	1649	1712	1783	1697	1706	1751	1819	1891	1963	2077	2175	2158
Montenegro									1561	1615	1449	1490	1513	1560	1623	1719	1810	1976	2189	2335
Croatia		5255	4395	3915	3469	3665	3896	4287	4490	4651	4549	4856	5018	5262	5545	5775	6018	6318	6644	6807
Slovenia		8317	7563	7168	7484	7795	8074	8359	8791	9120	9295	9999	10268	10666	10959	11421	11913	12565	13345	13789
Bosnia					388	487	927	1224	1368	1449	1491	1534	1603	1664	1766	1855	1970	2106	2223	2162
Former Czechoslovakia																				
Slovak Republic	5339	5211	4451	4134	3967	4195	4427	4773	5038	5251	5248	5326	5522	5775	6050	6351	6769	7339	8106	8591
Czech Republic		5336	4741	4713	4710	4812	5100	5314	5281	5245	5322	5521	5684	5803	6010	6275	6658	7088	7475	7593
Former Eastern Bloc Countries																				
Mongolia	519	496	445	400	388	396	420	427	440	450	459	456	463	479	506	552	585	627	683	735
Romania	2013	1896	1653	1533	1558	1622	1742	1817	1711	1632	1616	1651	1770	1888	1992	2165	2260	2444	2596	2845
Bulgaria	1805	1671	1545	1448	1438	1470	1519	1389	1373	1450	1487	1601	1699	1787	1897	2036	2177	2331	2494	2661
Hungary	4384	4240	3736	3623	3606	3718	3778	3824	3997	4213	4403	4690	4893	5123	5359	5623	5854	6097	6168	6216
Albania	1092	978	688	644	715	786	902	993	897	1015	1119	1202	1285	1319	1390	1466	1541	1612	1703	1825
Germany	18617	19428	20272	20566	20268	20714	21073	21213	21553	21998	22429	23114	23366	23316	23256	23544	23735	24562	25249	25547
Poland		3097	2870	2936	3040	3191	3410	3620	3874	4065	4250	4454	4532	4600	4781	5039	5224	5552	5932	6228
Formerly Occupied by and Neighboring Countries to the Eastern Bloc																				
Turkey	3099	3328	3293	3399	3596	3368	3572	3770	3987	4012	3815	4011	3727	3902	4052	4373	4680	4938	5104	5074
Finland	19907	19916	18614	17865	17638	18193	18844	19454	20602	21580	22368	23514	23997	24375	24804	25749	26410	27468	28811	28941
Greece	9872	9803	10010	9973	9723	9836	9966	10129	10432	10725	11043	11501	11948	12316	13006	13560	13811	14378	14962	15203
Italy	16211	16531	16772	16890	16730	17086	17569	17756	18079	18327	18592	19269	19608	19636	19481	19585	19568	19853	20001	19586
Cyprus	10161	10684	10488	11172	10982	11392	11870	11898	12006	12458	12916	13424	13810	13925	13947	14199	14408	14718	15149	15510
Austria	18743	19324	19743	20158	19861	20300	20752	21183	21617	22362	23052	23866	23896	24167	24259	24703	25130	25880	26786	27251

Legend: Peak | Trough | Rebound

2010 Human Development Report Data Trends for 1990 through 2009. (HDR, 2010, URL http://hdrstats.undp.org/en/tables/default.

233

Table 7.1 Data Validation.

Alph	Code	Country	HDI 90	HDI 08	CHHDI	POP 90	POP 08	CHPOP	GDP 90	GDP 08	CHGDP	Ic 90	Ic 08	DCHIc	CHIc	AveGroI
1	ALB	Albania	0.784	0.818	0.0434	3.29	3.14	-0.044	3.21634	5.73532	0.783	978	1825	847	0.87	1.07420
2	ARM	Armenia	0.731	0.798	0.0917	3.54	3.08	-0.132	2.81938	4.67694	0.659	709	1299	590	0.83	1.10038
3	AUT	Austria	0.899	0.955	0.0623	7.71	8.34	0.081	149.00226	227.18824	0.525	19324	27251	7927	0.41	1.04003
4	AZE	Azerbaijan	0.755	0.787	0.0424	7.16	8.68	0.212	8.95405	18.49928	1.066	1251	2131	880	0.70	1.09019
5	BLR	Belarus	0.795	0.826	0.0390	10.19	9.68	-0.050	14.36423	24.34728	0.695	1410	2515	1105	0.78	1.04436
6	BIH	Bosnia and Herzegovina	0.803	0.812	0.0112	4.31	3.77	-0.124	14.72311	8.38832	-0.430	1445	2162	717	0.50	1.17704
7	BGR	Bulgaria	0.803	0.840	0.0461	8.72	7.62	-0.126	14.56423	20.28838	0.393	1671	2661	991	0.59	1.05575
8	HRV	Croatia	0.817	0.871	0.0661	4.78	4.43	-0.072	25.11850	30.18004	0.202	5255	6807	1552	0.30	1.01763
9	CYP	Cyprus	0.849	0.914	0.0766	0.68	0.86	0.267	6.19550	12.30015	0.985	10684	15510	4826	0.45	1.04372
10	CZE	Czech Republic	0.847	0.903	0.0661	10.36	10.42	0.006	55.29847	79.15521	0.431	5336	7593	2257	0.42	1.02233
11	EST	Estonia	0.817	0.883	0.0808	1.57	1.34	-0.146	5.99731	9.53712	0.590	3822	7114	3291	0.86	1.08943
12	FIN	Finland	0.904	0.959	0.0608	4.99	5.31	0.066	99.30164	153.77649	0.549	19916	28941	9025	0.45	1.04582
13	GEO	Georgia	0.739	0.778	0.0528	5.46	4.31	-0.211	8.15151	5.47526	-0.328	1572	1249	-323	-0.21	0.97798
14	DEU	Germany	0.896	0.947	0.0569	79.43	82.11	0.034	1,543.19815	2,097.65409	0.359	19428	25547	6119	0.31	1.03244
15	GRC	Greece	0.872	0.942	0.0803	10.16	11.24	0.106	99.61032	170.83845	0.715	9803	15203	5400	0.55	1.05192
16	HUN	Hungary	0.812	0.879	0.0825	10.37	10.04	-0.032	43.98899	62.39562	0.418	4240	6216	1976	0.47	1.04632
17	ITA	Italy	0.889	0.951	0.0697	56.72	59.83	0.055	937.59563	1,171.87985	0.250	16531	19586	3056	0.18	1.02090
18	KAZ	Kazakhstan	0.778	0.804	0.0334	16.35	15.67	-0.041	26.34828	37.30545	0.416	1612	2580	768	0.48	1.02935
19	KGZ	Kyrgyzstan	0.687	0.710	0.0335	4.42	5.28	0.193	2.05628	2.00051	-0.027	465	379	-86	-0.18	0.96776
20	LVA	Latvia	0.803	0.866	0.0785	2.67	2.27	-0.151	10.41890	13.67848	0.313	3901	6036	2135	0.55	1.06772
21	LTU	Lithuania	0.828	0.870	0.0507	3.70	3.36	-0.092	15.86661	20.25503	0.277	4041	5154	1113	0.28	1.04310
22	MKD	Macedonia	0.782	0.817	0.0448	1.91	2.04	0.069	3.93216	4.43923	0.129	1919	2158	239	0.12	1.01114
23	MDA	Moldova	0.735	0.720	-0.0204	4.36	3.63	-0.167	3.61829	2.11109	-0.417	980	591	-389	-0.40	0.95608
24	MNG	Mongolia	0.676	0.727	0.0754	2.22	2.64	0.192	1.09942	1.94219	0.767	496	735	239	0.48	1.04736
25	MNE	Montenegro	0.815	0.834	0.0233	0.59	0.62	0.060	0.84815	1.45309	0.713	1445	2335	890	0.62	1.08264
26	POL	Poland	0.806	0.880	0.0918	38.12	38.13	0.000	118.04070	237.46529	1.012	3097	6228	3132	1.01	1.04206
27	ROM	Romania	0.786	0.837	0.0649	23.21	21.51	-0.073	43.98960	61.19855	0.391	1896	2845	949	0.50	1.04648
28	RUS	Russian Federation	0.821	0.817	-0.0049	148.29	141.95	-0.043	385.89232	432.02364	0.120	2602	3043	441	0.17	1.01746
29	SRB	Serbia	0.797	0.826	0.0364	7.59	9.15	0.206	10.960	2.99975	-0.726	1445	1262	-183	-0.13	0.98910
30	SVK	Slovakia	0.827	0.880	0.0641	5.28	5.41	0.023	27.52753	46.45063	0.687	5211	8591	3381	0.65	1.06460
31	SVN	Slovenia	0.853	0.929	0.0891	2.00	2.02	0.012	16.61857	27.87154	0.677	8317	13789	5472	0.66	1.01654
32	TJK	Tajikistan	0.636	0.688	0.0818	5.30	6.84	0.289	2.25952	1.67459	-0.259	426	245	-181	-0.43	0.89791
33	TUR	Turkey	0.705	0.806	0.1433	56.09	73.91	0.318	186.6412	375.0742	1.010	3328	5074	1747	0.52	1.05443
34	TKM	Turkmenistan	0.730	0.739	0.0123	3.67	5.04	0.375	3.82091	8.64527	1.263	1042	1714	672	0.65	1.07819
35	UKR	Ukraine	0.754	0.796	0.0557	51.89	46.26	-0.109	71.95329	53.46737	-0.257	1387	1156	-231	-0.17	0.96298
36	UZB	Uzbekistan	0.687	0.710	0.0335	20.51	27.31	0.332	14.04365	22.93184	0.633	685	840	155	0.23	1.02326

Table 7.1   Data Validation (Continued)

	Shadow Economy as a measure of Governance Corruption									Total Gross Domestic Product						
Country	SE 90	SE $ 90	SE 08	SE $ 08	CHSE%	SE/c 90	SE/c 08	$CHSE/c	CHSE/c	3GDP 90	3GDP 08	CH3GDP	3Ic 90	3Ic 08	$CH3TIc	CH3Ic
Albania	31.00 [I]	0.9971	36.30	2.0819	0.171	303	662	359	1.19	4.21	7.82	0.86	1281	2487	1206	0.942
Armenia	40.30	1.1362	48.70	2.2777	0.208	286	632	347	1.21	3.96	6.95	0.76	995	1931	936	0.942
Austria	7.00	10.4302	14.60	33.1695	1.086	1353	3979	2626	1.94	159.43	260.36	0.63	20676	31229	10553	0.510
Azerbaijan	45.10	4.0383	63.30	11.7100	0.404	564	1349	785	1.39	12.99	30.21	1.33	1815	3480	1665	0.918
Belarus	35.60	5.1137	49.80	12.1249	0.399	502	1252	751	1.50	19.48	36.47	0.87	1912	3767	1856	0.971
Bosnia and Herzegovina	28.00 [J]	4.1225	34.60	2.9024	0.236	405	748	344	0.85	18.85	11.29	-0.40	1850	2910	1061	0.574
Bulgaria	27.10	3.9469	37.50	7.6081	0.384	453	998	545	1.20	18.51	27.90	0.51	2123	3659	1536	0.723
Croatia	24.60	6.1792	34.70	10.4725	0.411	1293	2362	1069	0.83	31.30	40.65	0.30	6548	9168	2621	0.400
Cyprus	21.00	1.3011	29.40	3.6162	0.400	2244	4560	2316	1.03	7.50	15.92	1.12	12927	20069	7142	0.552
Czech Republic	13.10	7.2441	19.80	15.6727	0.511	699	1503	804	1.15	62.54	94.83	0.52	6035	9097	3062	0.507
Estonia	34.30	2.0571	40.30	3.8435	0.175	1311	2867	1556	1.19	8.05	13.38	0.66	5133	9980	4847	0.944
Finland	14.50	14.3987	18.50	28.4487	0.276	2888	5354	2466	0.85	113.70	182.23	0.60	22804	34295	11491	0.504
Georgia	45.10	3.6763	68.80	3.7670	0.525	709	859	151	0.21	11.83	9.24	-0.22	2280	2108	-172	-0.075
Germany	12.20	188.2702	16.10	337.7223	0.320	2370	4113	1743	0.74	1731.47	2435.38	0.41	21798	29660	7862	0.361
Greece	23.70	23.6076	29.90	51.0807	0.262	2323	4546	2222	0.96	123.22	221.92	0.80	12127	19749	7622	0.629
Hungary	22.30	9.8095	25.80	16.0981	0.157	946	1604	658	0.70	53.80	78.49	0.46	5186	7820	2634	0.508
Italy	23.40	219.3974	27.20	318.7513	0.162	3868	5327	1459	0.38	1156.99	1490.63	0.29	20399	24914	4515	0.221
Kazakhstan	31.90	8.4051	45.30	16.8994	0.420	514	1078	564	1.10	34.75	54.20	0.56	2126	3458	1332	0.627
Kyrgyzstan	35.20	0.7238	42.00	0.8402	0.193	164	159	-4	-0.03	2.78	2.84	0.02	629	538	-90	-0.144
Latvia	25.70	2.6777	41.70	5.7039	0.623	1003	2517	1514	1.51	13.10	19.38	0.48	4904	8553	3649	0.744
Lithuania	26.00	4.1253	31.90	6.4614	0.227	1051	1644	594	0.56	19.99	26.72	0.34	5091	6798	1707	0.335
Macedonia	35.60	1.3998	36.20	1.6070	0.017	683	781	98	0.14	5.33	6.05	0.13	2602	2940	337	0.130
Moldova	29.30	1.0602	45.80	0.9669	0.563	287	271	-16	-0.06	4.68	3.08	-0.34	1267	862	-405	-0.320
Mongolia	18.10 [V]	0.1990	37.90 [V]	0.7361	1.094	90	279	189	2.10	1.30	2.68	1.06	586	1014	428	0.731
Montenegro	23.60	0.0020	39.67	0.5764	0.681	341	926	585	1.72	0.85	2.03	1.39	1786	3261	1475	0.826
Poland	22.30	26.3231	28.00	66.4903	0.256	691	1744	1053	1.53	144.36	303.96	1.11	3787	7972	4185	1.105
Romania	27.30	12.0092	36.30	22.2151	0.330	517	1033	515	1.00	56.00	83.41	0.49	2413	3877	1464	0.607
Russian Federation	27.80	107.2781	48.60	209.9635	0.748	723	1479	756	1.04	493.17	641.99	0.30	3326	4523	1197	0.360
Serbia	23.60	2.5865	39.67	1.1900	0.681	341	501	160	0.47	13.55	4.19	-0.69	1786	1763	-23	-0.013
Slovakia	15.10	4.1567	19.70	9.1508	0.305	787	1693	906	1.15	31.68	55.60	0.75	5997	10284	4287	0.715
Slovenia	22.90	3.8057	28.00	7.8040	0.223	1905	3861	1956	1.03	20.42	35.68	0.75	10222	17650	7428	0.727
Tajikistan	24.00	0.5423	44.30	0.7418	0.846	102	109	6	0.06	2.80	2.42	-0.14	528	353	-175	-0.331
Turkey	20.50 [K]	38.2615	32.90 [K]	123.3994	0.605	682	1669	987	1.45	224.90	498.47	1.22	4010	6744	2734	0.682
Turkmenistan	24.00	0.9170	36.00 [L]	3.1123	0.500	250	617	367	1.47	4.74	11.76	1.48	1292	2331	1039	0.805
Ukraine	29.40	21.1543	53.90	28.8189	0.833	408	623	215	0.53	93.11	82.29	-0.12	1794	1779	-15	-0.009
Uzbekistan	22.10	3.1036	37.93 [M]	8.6980	0.716	151	318	167	1.10	17.15	31.63	0.84	836	1158	322	0.385

Table 7.1Data Validation (Continued)

Name	Life Expectancy[D]						Adult Literacy[D]			Educational Attainment Index[D]		
	Life Expectancy in 1990	Life Expectancy in 2007	Change in Life Expectancy from 1990 to 2007	Life Expectancy Index in 1990	Life Expectancy Index in 2007	Change in Life Expectancy from 1990 to 2007	Adult Literacy in 1990	Adult Literacy in 2007	Change in Adult Literacy from 1990 to 2007	Education Attainment Index in 1990	Education Attainment Index in 2007	Change in Education Attainment Index from 1990 to 2007
Country	LE 90	LE 07	CHLE	LEI 90	LEI 07	CHLEI	AL 90	AL 07	CHAL	EAI 90	EAI 07	CHEI
Albania	71.9	76.5	0.064	0.782	0.858	0.098	85.0	99.0	0.165	2.14	0.89	1.726
Armenia	67.9	73.6	0.084	0.715	0.810	0.133	93.0	99.5	0.070	2.25	0.91	1.846
Austria	75.6	79.9	0.057	0.844	0.915	0.084	99.0	99.0	0.000	2.90	0.96	2.568
Azerbaijan	65.6	70.0	0.066	0.677	0.751	0.108	93.0	99.5	0.070	2.25	0.88	1.858
Belarus	70.6	69.0	-0.023	0.760	0.733	-0.035	95.0	99.7	0.049	2.47	0.96	2.081
Bosnia and Herzegovina	66.7	75.1	0.125	0.696	0.834	0.199	92.7	96.7	0.043	2.34	0.87	1.966
Bulgaria	71.2	73.1	0.026	0.770	0.802	0.041	93.0	98.3	0.057	2.42	0.93	2.036
Croatia	71.9	76.0	0.056	0.782	0.850	0.087	92.7	98.7	0.065	2.34	0.92	1.949
Cyprus	76.5	79.6	0.040	0.859	0.910	0.060	87.0	97.7	0.123	2.27	0.91	1.869
Czech Republic	72.1	76.4	0.060	0.785	0.856	0.091	97.0	99.0	0.021	2.68	0.94	2.330
Estonia	69.4	72.9	0.051	0.740	0.799	0.080	96.0	99.8	0.040	2.66	0.96	2.298
Finland	70.5	71.6	0.015	0.759	0.777	0.024	93.0	99.0	0.065	2.25	0.92	1.843
Georgia	75.5	79.5	0.053	0.837	0.908	0.085	99.0	99.0	0.000	2.86	0.93	2.534
Germany	75.5	79.8	0.057	0.842	0.913	0.084	99.0	99.0	0.000	2.90	0.95	2.571
Greece	77.2	79.1	0.025	0.869	0.902	0.037	93.2	97.1	0.042	2.41	0.98	2.003
Hungary	69.4	73.3	0.056	0.740	0.805	0.088	97.0	98.9	0.020	2.73	0.96	2.378
Italy	76.9	81.1	0.055	0.864	0.935	0.082	97.1	98.9	0.019	2.54	0.97	2.160
Kazakhstan	66.7	64.9	-0.027	0.696	0.666	-0.043	93.0	99.6	0.071	2.25	0.97	1.821
Kyrgyzstan	66.3	67.6	0.020	0.688	0.710	0.033	93.0	99.3	0.068	2.25	0.92	1.842
Latvia	69.1	72.3	0.047	0.734	0.788	0.073	96.0	99.8	0.040	2.66	0.96	2.299
Lithuania	70.8	71.8	0.014	0.763	0.780	0.022	96.0	99.7	0.039	2.66	0.97	2.296
Macedonia	71.4	74.1	0.038	0.773	0.819	0.059	92.7	97.0	0.046	2.34	0.88	1.964
Moldova	67.6	68.3	0.011	0.709	0.722	0.018	95.0	99.2	0.044	2.38	0.90	2.002
Mongolia	60.8	66.2	0.089	0.596	0.687	0.152	93.0	97.3	0.046	2.42	0.91	2.043
Montenegro	75.6	74.0	-0.021	0.843	0.817	-0.030	92.3	96.4	0.045	2.34	0.89	1.959
Poland	71.1	75.5	0.061	0.769	0.842	0.095	96.0	99.3	0.034	2.57	0.95	2.200
Romania	69.4	72.5	0.045	0.740	0.792	0.070	95.0	97.6	0.027	2.47	0.92	2.100
Russian Federation	67.9	66.2	-0.025	0.714	0.686	-0.039	94.0	99.5	0.059	2.61	0.93	2.253
Serbia	71.6	73.9	0.033	0.776	0.816	0.051	92.3	96.4	0.045	2.34	0.89	1.959
Slovakia	71.6	74.6	0.043	0.776	0.827	0.065	97.0	99.0	0.021	2.72	0.93	2.379
Slovenia	73.1	78.2	0.070	0.801	0.886	0.106	92.7	99.7	0.076	2.34	0.97	1.926
Tajikistan	62.9	66.4	0.056	0.632	0.691	0.093	93.0	99.6	0.071	2.25	0.90	1.852
Turkey	64.6	71.7	0.109	0.660	0.779	0.179	80.7	88.7	0.099	1.82	0.83	1.365
Turkmenistan	62.8	64.6	0.029	0.629	0.661	0.050	93.0	99.5	0.070	2.25	0.91	1.847
Ukraine	69.7	68.2	-0.022	0.745	0.720	-0.034	93.0	99.7	0.072	2.30	0.96	1.883
Uzbekistan	66.8	67.6	0.012	0.697	0.711	0.019	93.0	96.9	0.042	2.25	0.89	1.855

Table 7.1 Data Validation (Continued)

Name	Life Expectancy[D]						Adult Literacy[D]			Educational Attainment Index[D]		
Country	LE 90	LE 07	CHLE	LEI 90	LEI 07	CHLEI	AL 90	AL 07	CHAL	EAI 90	EAI 07	CHEI
Albania	71.9	76.5	0.064	0.782	0.858	0.098	85.0	99.0	0.165	2.14	0.89	1.726
Armenia	67.9	73.6	0.084	0.715	0.810	0.133	93.0	99.5	0.070	2.25	0.91	1.846
Austria	75.6	79.9	0.057	0.844	0.915	0.084	99.0	99.0	0.000	2.90	0.96	2.568
Azerbaijan	65.6	70.0	0.066	0.677	0.751	0.108	93.0	99.5	0.070	2.25	0.88	1.858
Belarus	70.6	69.0	-0.023	0.760	0.733	-0.035	95.0	99.7	0.049	2.47	0.96	2.081
Bosnia and Herzegovina	66.7	75.1	0.125	0.696	0.834	0.199	92.7	96.7	0.043	2.34	0.87	1.966
Bulgaria	71.2	73.1	0.026	0.770	0.802	0.041	93.0	98.3	0.057	2.42	0.93	2.036
Croatia	71.9	76.0	0.056	0.782	0.850	0.087	92.7	98.7	0.065	2.34	0.92	1.949
Cyprus	76.5	79.6	0.040	0.859	0.910	0.060	87.0	97.7	0.123	2.27	0.91	1.869
Czech Republic	72.1	76.4	0.060	0.785	0.856	0.091	97.0	99.0	0.021	2.68	0.94	2.330
Estonia	69.4	72.9	0.051	0.740	0.799	0.080	96.0	99.8	0.040	2.66	0.96	2.298
Finland	70.5	71.6	0.015	0.759	0.777	0.024	93.0	99.0	0.065	2.25	0.92	1.843
Georgia	75.5	79.5	0.053	0.837	0.908	0.085	99.0	99.0	0.000	2.86	0.93	2.534
Germany	75.5	79.8	0.057	0.842	0.913	0.084	99.0	99.0	0.000	2.90	0.95	2.571
Greece	77.2	79.1	0.025	0.869	0.902	0.037	93.2	97.1	0.042	2.41	0.98	2.003
Hungary	69.4	73.3	0.056	0.740	0.805	0.088	97.0	98.9	0.020	2.73	0.96	2.378
Italy	76.9	81.1	0.055	0.864	0.935	0.082	97.1	98.9	0.019	2.54	0.97	2.160
Kazakhstan	66.7	64.9	-0.027	0.696	0.666	-0.043	93.0	99.6	0.071	2.25	0.97	1.821
Kyrgyzstan	66.3	67.6	0.020	0.688	0.710	0.033	93.0	99.3	0.068	2.25	0.92	1.842
Latvia	69.1	72.3	0.047	0.734	0.788	0.073	96.0	99.8	0.040	2.66	0.96	2.299
Lithuania	70.8	71.8	0.014	0.763	0.780	0.022	96.0	99.7	0.039	2.66	0.97	2.296
Macedonia	71.4	74.1	0.038	0.773	0.819	0.059	92.7	97.0	0.046	2.34	0.88	1.964
Moldova	67.6	68.3	0.011	0.709	0.722	0.018	95.0	99.2	0.044	2.38	0.90	2.002
Mongolia	60.8	66.2	0.089	0.596	0.687	0.152	93.0	97.3	0.046	2.42	0.91	2.043
Montenegro	75.6	74.0	-0.021	0.843	0.817	-0.030	92.3	96.4	0.045	2.34	0.89	1.959
Poland	71.1	75.5	0.061	0.769	0.842	0.095	96.0	99.3	0.034	2.57	0.95	2.200
Romania	69.4	72.5	0.045	0.740	0.792	0.070	95.0	97.6	0.027	2.47	0.92	2.100
Russian Federation	67.9	66.2	-0.025	0.714	0.686	-0.039	94.0	99.5	0.059	2.61	0.93	2.253
Serbia	71.6	73.9	0.033	0.776	0.816	0.051	92.3	96.4	0.045	2.34	0.89	1.959
Slovakia	71.6	74.6	0.043	0.776	0.827	0.065	97.0	99.0	0.021	2.72	0.93	2.379
Slovenia	73.1	78.2	0.070	0.801	0.886	0.106	92.7	99.7	0.076	2.34	0.97	1.926
Tajikistan	62.9	66.4	0.056	0.632	0.691	0.093	93.0	99.6	0.071	2.25	0.90	1.852
Turkey	64.6	71.7	0.109	0.660	0.779	0.179	80.7	88.7	0.099	1.82	0.83	1.365
Turkmenistan	62.8	64.6	0.029	0.629	0.661	0.050	93.0	99.5	0.070	2.25	0.91	1.847
Ukraine	69.7	68.2	-0.022	0.745	0.720	-0.034	93.0	99.7	0.072	2.30	0.96	1.883
Uzbekistan	66.8	67.6	0.012	0.697	0.711	0.019	93.0	96.9	0.042	2.25	0.89	1.855

Table 7.1 Data Validation (Continued)

Country	EE 90[G]	EE 08[H]	CHEE	3EE90 as %	D3EE/c 90	D3EE 90	3EE08 as %	DTEE/c 08	D3EE 08	CH3EEC H	DCH3EE	DCHAEE/c	CHAEE/c
Albania	10.87	8.43	-0.22	8.30	139.23	458	6.19	210	659	-0.254	201	71	0.507
Armenia	20.50 [N]	13.20	-0.36	14.61	203.87	723	8.88	255	785	-0.392	62	51	0.251
Austria	8.13	11.17	0.37	7.60	1680.50	12958	9.75	3489	29085	0.283	16127	1808	1.076
Azerbaijan	26.66	18.52	-0.31	18.38	483.87	3464	11.34	645	5595	-0.383	2131	161	0.332
Belarus	17.10 [N]	11.26	-0.34	12.61	326.89	3331	7.51	424	4105	-0.404	774	97	0.297
Bosnia and Herzegovina	18.70 [O]	15.60 [Z]	-0.17	14.61	345.88	1490	11.59	454	1713	-0.207	223	108	0.313
Bulgaria	8.54	9.26	0.08	6.72	181.32	1581	6.74	339	2584	0.002	1003	158	0.869
Croatia	18.70 [O]	9.80	-0.48	15.01	1224.41	5853	7.28	899	3984	-0.515	-1868	-326	-0.266
Cyprus	13.17	13.64	0.04	10.88	1701.93	1158	10.54	2738	2362	-0.031	1203	1036	0.609
Czech Republic	16.90 [N]	9.77	-0.42	14.94	1019.95	10570	8.15	889	9263	-0.454	-1307	-131	-0.129
Estonia	25.50 [N]	14.78	-0.42	18.99	1309.03	2054	10.53	1475	1977	-0.445	-77	166	0.127
Finland	11.90	12.59	0.06	10.39	2713.67	13530	10.63	4318	22946	0.022	9415	1605	0.591
Georgia	6.90	10.11	0.46	4.76	157.34	859	5.99	213	918	0.259	59	56	0.354
Germany	9.20	10.01	0.09	8.20	2005.40	159295	8.62	2968	243712	0.051	84416	963	0.480
Greece	6.95	8.05	0.16	5.61	842.25	8558	6.20	1590	17869	0.104	9311	748	0.888
Hungary	5.27	11.50	1.18	4.31	273.31	2835	9.14	899	9027	1.121	6191	626	2.290
Italy	9.62	9.51	-0.01	7.79	1961.91	111278	7.48	2369	141757	-0.041	30479	407	0.208
Kazakhstan	18.88	13.26	-0.30	14.32	401.46	6563	9.13	459	7190	-0.362	627	57	0.143
Kyrgyzstan	23.10 [N]	18.25	-0.21	17.09	145.20	642	12.85	98	518	-0.248	-124	-47	-0.323
Latvia	16.80 [N]	22.66	0.35	13.37	823.84	2200	15.99	1938	4393	0.197	2192	1115	1.353
Lithuania	21.80 [N]	14.58	-0.33	17.30	1109.85	4104	11.06	991	3329	-0.361	-776	-119	-0.107
Macedonia	18.70 [O]	15.16	-0.19	13.79	486.59	929	11.13	445	909	-0.193	-20	-41	-0.084
Moldova	22.90	20.20	-0.12	17.71	290.17	1266	13.85	174	633	-0.218	-634	-116	-0.400
Mongolia	17.96	15.94	-0.11	15.20	105.20	233	11.56	162	427	-0.240	194	56	0.536
Montenegro	18.70 [O]	9.33 [R]	-0.50	18.66	333.99	196	6.68	304	189	-0.642	-7	-30	-0.089
Poland	12.20	12.12	-0.01	9.97	461.95	17609	9.47	966	36848	-0.050	19239	505	1.092
Romania	13.60 [N]	11.55	-0.15	10.68	328.17	7616	8.47	448	9632	-0.207	2016	120	0.364
Russian Federation	9.60 [N]	11.60	0.21	7.51	319.26	47344	7.80	524	74445	0.039	27100	205	0.643
Serbia	18.70 [O]	11.09	-0.41	15.13	333.92	2533	7.94	195	1787	-0.475	-746	-138	-0.415
Slovakia	16.90 [P]	11.05	-0.35	14.68	1013.56	5355	9.23	1136	6144	-0.371	790	123	0.121
Slovenia	16.10 [N]	12.59	-0.22	13.10	1645.71	3288	9.83	2221	4490	-0.249	1202	576	0.350
Tajikistan	29.33	17.10	-0.42	23.65	154.95	822	11.85	60	413	-0.499	-408	-94	-0.610
Turkey	10.55	14.74	0.40	8.75	422.91	23719	11.09	994	73461	0.267	49742	571	1.350
Turkmenistan	24.50	21.03	-0.14	19.76	316.48	1161	15.47	490	2473	-0.217	1312	174	0.549
Ukraine	24.35	17.67	-0.27	18.82	436.92	22673	11.48	314	14539	-0.390	-8134	-123	-0.281
Uzbekistan	22.84	21.59	-0.05	18.71	190.95	3916	15.65	250	6828	-0.163	2911	59	0.309

Government Education Expenditure [E]

Column descriptions:
- EE 90[G]: Education Expenditure in 1990 as % of Total Expenditures
- EE 08[H]: Education Expenditure in 2008 as % of Total expenditures
- CHEE: %Change in Education Expenditure from 1990 to 2008
- 3EE90 as %: Total Education Expenditure in 1990 as a % of Total GDP public expenditure
- D3EE/c 90: Standardized Total Education Expenditure in 1990 per capita as a % of Total GDP
- D3EE 90: Total Dollars per country in Education Expense in 1990 in Millions
- 3EE08 as %: Total Education Expenditure in 2008 as a % of Total GDP public expenditure
- DTEE/c 08: Standardized Total Education Expenditure in 2008 per capita as a % of Total GDP
- D3EE 08: Total Dollars per country in Education Expense in 2008 in Millions
- CH3EEC H: Change in the Total Education Expenditure from 1990 to 2008
- DCH3EE: Dollar Change in the Total Education Expense in Millions
- DCHAEE/c: Change in the Total Education Expenditure $ per capita from 1990 to 2008
- CHAEE/c: Change in the Total Education Expenditure as % per capita from 1990 to 2008

Figure 7 Data Validation Comparison.

Equation 4.1-4.4 Analyses and Comparison

Table 4.5: Research Question 4 Equation Comparison: Do the pre-test HDI, Shadow Economy*, and Education Expenditure** together explain the change in Income per capita?

$\Delta Ic3 = HDI_{1990} + SE_{2008+}$	$EE_{90} + EE_{08}$	$\%\Delta EEc$	$\$\Delta EE$	$\$\Delta EEc$	3Ic 08
Country	Eq 4.1	Eq 4.2	Eq 4.3	Eq 4.4	Actual
Finland	30703	29605	29875	32991	34295
Austria	28735	27889	27939	31689	31229
Germany	29276	28608	28846	29636	29660
Italy	26614	26068	26351	25622	24914
Cyprus	18339	17399	17674	19675	20069
Greece	17504	17273	17424	18185	19749
Slovenia	15413	14713	15178	15429	17650
Slovakia	10638	10366	10946	9507	10284
Estonia	7971	7548	8146	7725	9980
Croatia	9255	9343	10007	7607	9168
Czech Republic	10936	10838	11491	8948	9097
Latvia	9380	7417	7456	10638	8553
Poland	7784	7242	7522	7967	7972
Hungary	10016	10012	9258	10001	7820
Lithuania	9168	8529	9068	7205	6798
Turkey	5211	4752	4725	6559	6744
Estonia	7423	6802	6569	7812	6182
Croatia	7136	6489	6149	7697	5718
Czech Republic	6849	6176	5729	7582	5255
Latvia	6562	5863	5309	7467	4791
Azerbaijan	1490	865	1345	2357	3480
Kazakhstan	3529	3212	3717	3465	3458
Montenegro	3536	4024	4794	3665	3261
Macedonia	5383	4662	5036	4053	2940
Bosnia and Herzegovina	5421	4566	4962	4255	2910
Albania	3275	3330	3761	3164	2487
Turkmenistan	3134	2004	2396	2677	2331
Georgia	987	1053	945	1937	2108
Armenia	641	572	1089	1391	1931
Ukraine	2081	1556	2059	1710	1779
Serbia	3724	3707	4325	2976	1763
Uzbekistan	1410	333	2059	1016	1158
Mongolia	23	-267	132	577	1014
Moldova	2336	1332	1698	1253	862
Kyrgyzstan	289	-272	124	245	538
Tajikistan	-2487	-2094	-1488	-964	353
Average					8564
Average	8602	8098	8406	8714	8455
Difference	38	-466	-158	150	
Grande Total Average Difference					109
RMSE	1776.3	1770.8	1822.4	1097.0	
Adjusted R2	0.6714	0.6698	0.6502	0.8733	
Akaike's IC Score	645.10	644.42	646.49	609.95	
F-Score	18.88	24.66	22.69	81.38	

Research Question #4 Equations Comparison Against Actual 2008 Income per Capita

— Eq 4.1 — Eq 4.2 — Eq 4.3 — Eq 4.4 - - Actual

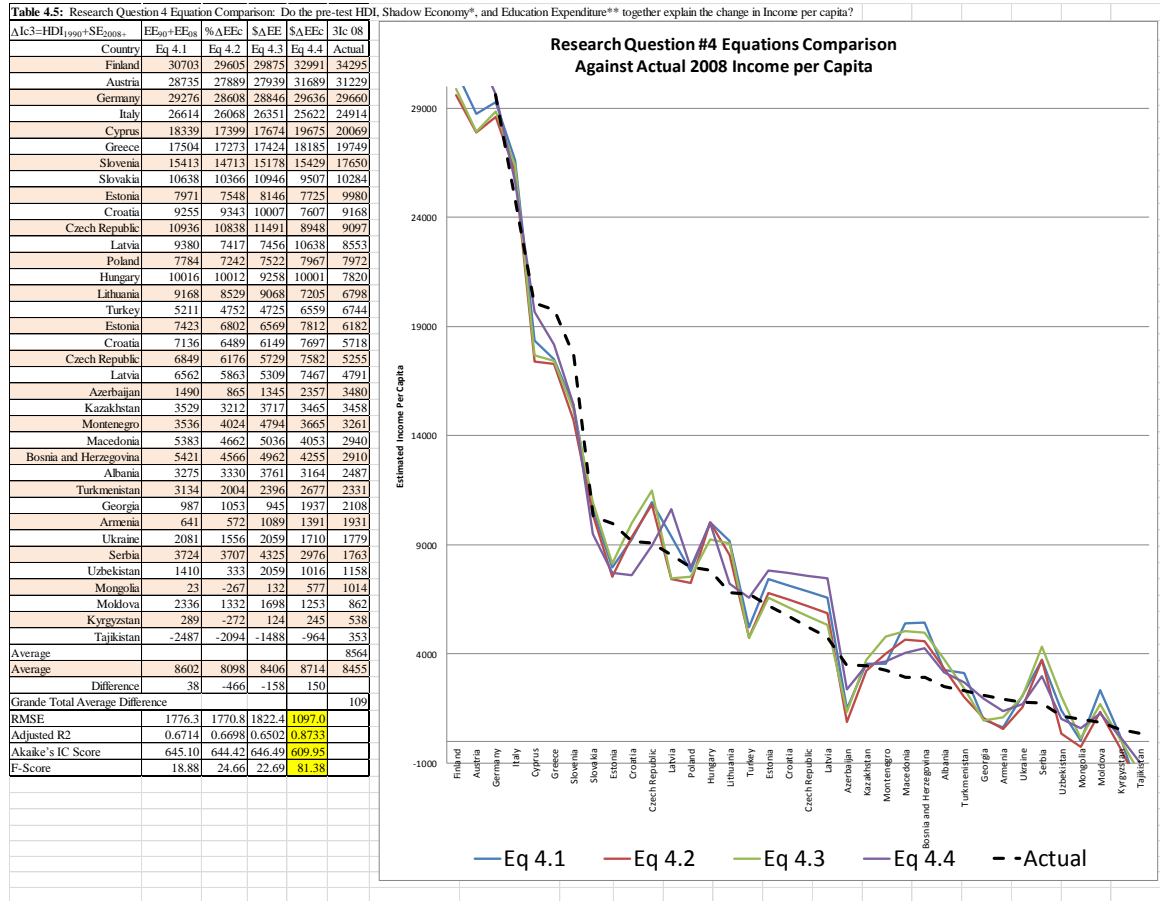Table 7.2 Data Validation Equation Analysis.

	Equation	Observations	Confidence level	Adjusted R2	F-Score	Total Degrees of Freedom	2-t Rule of Thumb	Significant Coefficients	Sign correct?	RMSE	White's Heteroscedasticity Score		Skewness	Kurtosis	Akaike's Information Criteria Score	Cameron & Trivedi's decomposition	Better Model for prediction	t-value
	Data Analysis																	
2.1a	Ho: $DIc_3 \neq HDI_{1990}$		95%	0.7997	124.81		Y	Y	Y	0.83555	2.37/2	Y	5.49/1	.07/1	81.2482	7.93/4		
2.1b	Ho: $DIc_3 \neq HDI_{1990}$ and SE_{2008}			0.8248	73.97			Y	Y	Y	0.78156	2.36/5	N	1.02/2	.46/1	77.8883	3.84/8	X	
3.1	Ho: $DEEc_3 \neq SE_{2008}$	36	95%	0.0012	1.04	35	N	Y	Y	0.37088								
4.1	Ho: $D3Ic \neq HDI_{1990} + SE_{2008} + EEc_{3\,1990} + EEc_{3\,2008}$	36	95%	0.6714	18.88	35	N	Y	Y	1766.3	19.48/14	Y	5.04/4	2.41/1	645.1	26.93/19	1.4	
4.2	Ho: $D3Ic \neq HDI_{1990} + SE_{2008} + \%D3EEc$	36	95%	0.6698	24.66	35	N	Y	Y	1770.8	14.27/9	Y	7.98/3	.52/1	644.423	22.77/13	1.7	
4.3	Ho: $D3Ic \neq HDI_{1990} + SE_{2008} + \$D3EE$	36	95%	0.6502	22.69	35	N	Y	Y	1822.4	25.39/9	Y	10.37/3	.96/1	646.493	36.72/13	2.8	
4.4	Ho: $D3Ic \neq HDI_{1990} + SE_{2008} + \$D3EEc$	36	95%	0.8733	81.38	35	Y	Y	Y	1097	8.73/9	N	6.33/3	.06/1	609.948	15.13/13	1.2	
4.5	Ho: $D3Ic \neq HDI_{1990} + SE_{2008} + \$D3EEc + Group$	36	95%	86.95	59.3	35	N	Y	Y	1113.1	13.01/14	N	5.35/4	.06/1	611.853	18.42/19	0.9	
	Data Testing for Validity and Reliability																	
1	Ho : $HDI_{1990} \neq GDPI_{1990} + LEI_{1990} + EI_{1990}$		95%	0.9148	119.18		Y	Y	Y	0.01863								
2	Ho : $HDI_{2007} \neq GDPI_{2007} + LEI_{2007} + EI_{2007}$		95%	0.9997	44500		Y	Y	Y	0.00117								
3	Ho: $DHDI = DGDPI + DLEI + DEAI$		95%	0.1882	8.19		Y	Y	Y	1.6824								
4	Ho : $DIc = DHDI$																	
5	Ho: Mean Ave of SE Set = Mean Ave of SE Sample Set	185	99.90%			183												-2.4559
6	Ho: Mean Ave SE Sample Set MIMIC6 =Mean Ave SE Sa	23	99.9			22												-4.8587
7	Ho: $DIc = SE_{1990} + SE_{2007}$	36	95%	44.12	14.82	35	N	Y	N	2303								
8	Ho: $DIc = SE_{1990}$	36	95%	32.44	17.8	35	Y	Y	Y	2533								
9	Ho: $DIc = SE_{2008}$	36	95%	45.73	28.88	35	Y	Y	Y	2270								
10	Ho: Mean Ave EE of set $\neq$ Mean Ave EE Sample Set	171	95%			169												1.1723
5.1	Ho: $D3Ic \neq SE_{2008} + \%D3EEc$		95%	0.9176	118		Y	Y	Y	0.5815	8.60/5	Y	3.83/2	.56/1	41.3533	12.99/8	X	
5.2	Ho: $D3Ic \neq SE2008$ $D3EE$		95%	0.6049	17.07		N	Y	Y	1.2737	3.72/5	N	3.55/2	.78/1	75.8537	8.05/8		

240

Table 7.3 Data Sources.

A	2010 Human Development Report Data Trends for 1990 through 2009. (HDR, 2010, URL. http://hdr.undp.org/en/statistics/)
B	Own Calculations. Average growth rate is a 2-year rolling average.
C	Schneider, Friedrich Georg & Enste, Dominik H. (2000). Shadow Economies Around the World: Size, Causes, and Consequences. International Monetary Fund, Working Paper 00/26, 56. Table 2.
D	(2009e). Human Development Report. New York, NY: United Nations Development Programme.
E	UNESCO Institute for Statistics (2010).
F	Schneider, Friedrich Georg, Buehn, Andreas & Montenegro, Claudio E. (2010). Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2007. World Bank Working Paper Series, 5356, 53. Table 6.
G	(2009e). Human Development Report. New York, NY: United Nations Development Programme.
H	2010 Human Development Report Data Trends for 1990 through 2009. (HDR, 2010, URL. http://hdrstats.undp.org/en/tables/default.html)
I	Yair Eilat, Clifford Zinnes (2000). The Evolution of the Shadow Economy in Transition Countries: Consequences for Economic Growth and Donor Assistance. CAER II Discussion Paper No. 83. Table 1.
J	The Former Socialist Federal Republic of Yugoslavia states, including Bosnia and Herzegovina, are represented by the data for Macedonia
K	Ahmet Burçin Yereli, İbrahim Erdem Seçilmiş, Alparslan Başaran, (2007) Shadow Economy an Public Debt Sustainability in Turkey, DOI:10.2298
L	Schneider, Friedrich Georg, Buehn, Andreas & Montenegro, Claudio E. (2010). Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2007. World Bank Working Paper Series, 5356, 53. Table 6. Average for Transcaucasia.
M	Schneider, Friedrich Georg, Buehn, Andreas & Montenegro, Claudio E. (2010). Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2007. World Bank Working Paper Series, 5356, 53. MIMIC6 Figure.
N	(1998, Table 31). Human Development Report. New York, NY: United Nations Development Programme.
O	The Former Socialist Federal Republic of Yugoslavia states are represented by the data for Macedonia
P	The Former Czechoslovakia states are represented by the data for the Czech Republic
Q	Serbia and Kosovo figures are combined
R	Serbia and Montenegro are reported together
z	Table N in HDR 2009 for 2007: Health and Education data from UNESCO Institute for Statistics (UNESCO, 2009),Table 19: http://stats.uis.unesco.org. Accessed 8/26/2010.
H.	Table H in HDR 2009 for 2007: Summary Statistics (HDR, 2009).
M.	Table M in HDR 2009 for 2007: Economy and Inequality (HDR, 2009).
V	Zhou, Fujin (2007). The Shadow Economy in Mongolia: Size, Causes and Consequences. Tinbergen Institute Amsterdam, 42.

Table 4.1 Correlation Coefficient Matrix.

```
Variable IcChDc    HDICh LEI EAI
IcChDc1.0000
HDICh0.5005    1.0000
LEI_EAI0.6793    0.2639    1.000
```

Table 4.2 Correlation Coefficient Matrix.

```
Variable HDI1990IcChDc    SE2008
HDI19901.0000
IcChDc0.6532    1.0000
SE2008-0.5148  -0.5981    1.0000
```

Table 4.3 Correlation Coefficient Matrix.

```
VariableSE1990    SE2008  EEDc2008
SE19901.0000
SE20080.83591.0000
EEDc2008-0.4450-0.58071.0000
```

Table 4.4 Correlation Coefficient Matrix.

```
VariableIc_O Ic_U Ic_T  HDI1990 EEΔ$c
Ic_O1.0000
Ic_U0.8882    1.0000
Ic_T 0.9971    0.90701.0000
HDI_1990 0.7260    0.7994    0.73591.0000
EEΔ$c0.7763  0.7129    0.7875    0.5704    1.0000
```

Table 7.4 Correlation Coefficient Matrix.

Test: Correlate the change in Total Income per Capita, change in Total Education Expenditures, pre-test Human Development Index, pre-test Shadow Economy, change in Life Expectancy Index, change in Education Attainment Index, post-test Shadow Economy, change in Shadow Economy, Country Group   (obs=36)

```
Variable$ΔIc3$ΔEEc3   HDI_1990    SE_2008ΔLEIΔEAI SE_1990ΔSEGroup
$ΔIc31.0000
$ΔEEc3 0.8619  1.0000
HDI_1990 0.7710  0.5549  1.0000
SE_2008   -0.687 -0.5285 -0.6040   1.0000
ΔLEI 0.0807 0.1046 -0.1254  -0.1996   1.0000
ΔEAI 0.2757 0.2394 0.4848  -0.2350   -0.0567 1.0000
SE_1990  -0.586  -0.510 -0.4409   0.8660   -0.0844 -0.2308  1.0000
ΔSE    -0.126  0.0618 -0.3071   0.1641   -0.1256 0.0313  -0.3163
Group0.6549 0.5661   0.5648  -0.6958   0.3222  -0.0434 -0.6077  -0.089
```

GLOSSARY

Organizations and Acronyms

Organizations: Affiliated Programs, Reports and Data
        Intergovernmental Organizations (IGO)
        International Governmental Organizations (IGO)
        Non-governmental Organizations (NGO)
        Nonprofit or Not for profit Organizations (NO)

IGOs

        United Nations (UN):

        United Nations Education, Science, and Cultural Organization (UNESCO)
        Statistical Information System on Expenditure in Education (SISEE)
        United Nations Development Program (UNDP)
        Human Development Report (HDR)
        Human Development Index (HDI)
        Gross Domestic Product Index (GDPI)
        Life Expectancy Index (LEI)
        Educational Attainment Index (EAI)
        Income per capita (Ic)
        Millennium Development Goals (MDGs)
        Millennial Development Goals Report (MDGR)
        United Nations Infants and Children's Emergency Fund (UNICEF)

        World Bank (Bank):

        World Bank Group (WBG)
        Global Monitoring Report (GMR)
        International Comparisons Program (ICP)
        World Bank Development Economics Research Group (DERG)
        World Development Report (WDR)
        World Development Indicators (WDI)
        World Governance and Anticorruption Indicators (WGI)
        Business Environment and Enterprise Performance Survey (BEEPS)
        World Bank Human Development Network (HDN)
        Education Statistics (EdStats)
        The International Monetary Fund (IMF)
        Global Monitoring Report (GMR)
        World Economic Outlook (WEO)
        International Financial Statistics (IFS)
        International Accounting Standards (IAS)
        International Financial Reporting Standards (IFRS)

        Organisation for Economic Co-operation and Development (OECD)

NGOs: International and National Institutes, Policy Centers, and Foundations

Council on International and Public Affairs (CIPA)
World Trade Organization (WTO)
Brooking Institution (BI)
Transparency International (TI)
Global Corruption Report (GCR)
Corruptions Perceptions Index (CPI)
Global Corruption Barometer (GCB)
Bribe Payers Index (BPI)
National Integrity System (NIS)
The Heritage Foundation (HF)
Index of Economic Freedom (EFI)

Governmental Bodies and Data

United States (US)

CIA World Fact Book (CIA)
US Library of Congress (LOC)
United States State Department (DOS)
Countries and Regions: Background Notes
United States Agency for International Development (USAID)
System of National Accounts or National Income accounting (NI)

European Commission (EU)

Europa World Fact Book (Europa)
European Statistics (Eurostat)
European Statistics, Data, and Metadata Exchange (SDMD)
European Bank for Reconstruction and Development (EBRD)

Organizations and Acronyms - Glossary (Continued)

Glossary: Data Legend								
Variable		Population				Per Capita		
		1990	2007	Change		1990	2007	Change
Human Development Index	HDI	HDI_{1990}	HDI_{2007}	ΔHDI				
Actual Years Measured		1990	2007					
Shadow Economy SE	SE	SE_{1990}	SE_{2007}	ΔSE				
Natural Log of SE	ln SE	$ln\, SE_{1990}$	$ln\, SE_{2007}$					
Actual Years Measured		1989-1999	2000-2007					
Gross Domestic Product	GDP	GDP_{1990}	GDP_{2007}	ΔGDP	Ic	Ic_{1990}	Ic_{2007}	ΔIc
Official - *on the books*	GDP_1	$GDP_{1\,1990}$	$GDP_{1\,2007}$	ΔGDP_1	Ic_1	$Ic_{1\,1990}$	$Ic_{1\,2007}$	ΔIc_1
Shadow Economy - *on the ground*	GDP_2	$GDP_{2\,1990}$	$GDP_{2\,2007}$	ΔGDP_2	Ic_2	$Ic_{2\,1990}$	$Ic_{2\,2007}$	ΔIc_2
Total	GDP_3	$GDP_{3\,1990}$	$GDP_{3\,2007}$	ΔGDP_3	Ic_3	$Ic_{3\,1990}$	$Ic_{3\,2007}$	ΔIc_3
Actual Years Measured		1990	2007			1990	2007	
Education Expenditure	EE	EE_{1990}	EE_{2007}	ΔEE	EEc	EEc_{1990}	Eec_{2007}	ΔEEc
Official - *on the books*	EE_1	$EE_{1\,1990}$	$EE_{1\,2007}$	ΔEE_1	EEc_1	$EEc_{1\,1990}$	$EEc_{1\,2007}$	ΔEEc_1
Shadow Economy effect - *on the ground*	EE_2	$EE_{2\,1990}$	$EE_{2\,2007}$	ΔEE_2	EEc_2	$EEc_{2\,1990}$	$EEc_{2\,2007}$	ΔEEc_2
Total	EE_3	$EE_{3\,1990}$	$EE_{3\,2007}$	ΔEE_3	EEc_3	$EEc_{3\,1990}$	$EEc_{3\,2007}$	ΔEEc_3
Actual Years Measured		1989-1995	2000-2007			1989-1995	2000-2007	
Government Expenditure	GE	GE_{1990}	GE_{2007}	ΔGE				
Official - *on the books*	GE_1	$GE_{1\,1990}$	$GE_{1\,2007}$	ΔGE_1				
Shadow Economy effect - *on the ground*	GE_2	$GE_{2\,1990}$	$GE_{2\,2007}$	ΔGE_2				
Total	GE_3	$GE_{3\,1990}$	$GE_{3\,2007}$	ΔGE_3				
Actual Years Measured		1990	2007					

Several agencies are sub-divisions of the United Nations (UN): the United Nations Education, Science, and Cultural Organization (UNESCO), the United Nations Development Program (UNDP), United Nations Infants and Children's Emergency Fund (UNICEF), the Human Development Program (HDP), and the Millennium Development Goals (MDGs). Other agencies exist within the broader UN system. This, according to the IMF (IMF, 2010g, p. 1).

The IMF and the World Bank are institutions in the United Nations system. They share the same goal of raising living standards in their member countries. Their approaches to this goal are complementary, with the IMF focusing on macroeconomic issues and the World Bank concentrating on long-term economic development and poverty reduction.

Several agencies are sub-divisions of the World Bank (Bank), specifically, the World Bank Group (WBG), along with the World Bank Human Development Network and its affiliates, the World Bank Development Economics Research Group, and the World Bank Education and Development Research Groups, which produce the World Governance and Anticorruption Indicators (WGI), and Education Statistics (EdStats). The International Monetary Fund (IMF) co-produces the Global Monitoring Report (GMR), sharing its banking and financial statistics for the Millennial Development Goals (MDGs) and the network of agencies. Regional and national agencies such as Organisation for Economic Co-operation and Development (OECD), Europa World Fact Book (Europa), European Commission (Eurostat), CIA World Fact Book (CIA), The US Library of Congress (LOC), and the United States State Department (DOS) all research, compile, share, and report research, information, and data. An agency or an affiliated institute, think-tank, or foundation may employ researchers adding to this network of information, research, and data. Senior Fellow at the Brookings Institution, Daniel Kaufmann, previously "served as a director at the World Bank Institute, where he pioneered new approaches to measure and analyze governance and corruption, helping countries formulate action programs" (2010f, p. K).
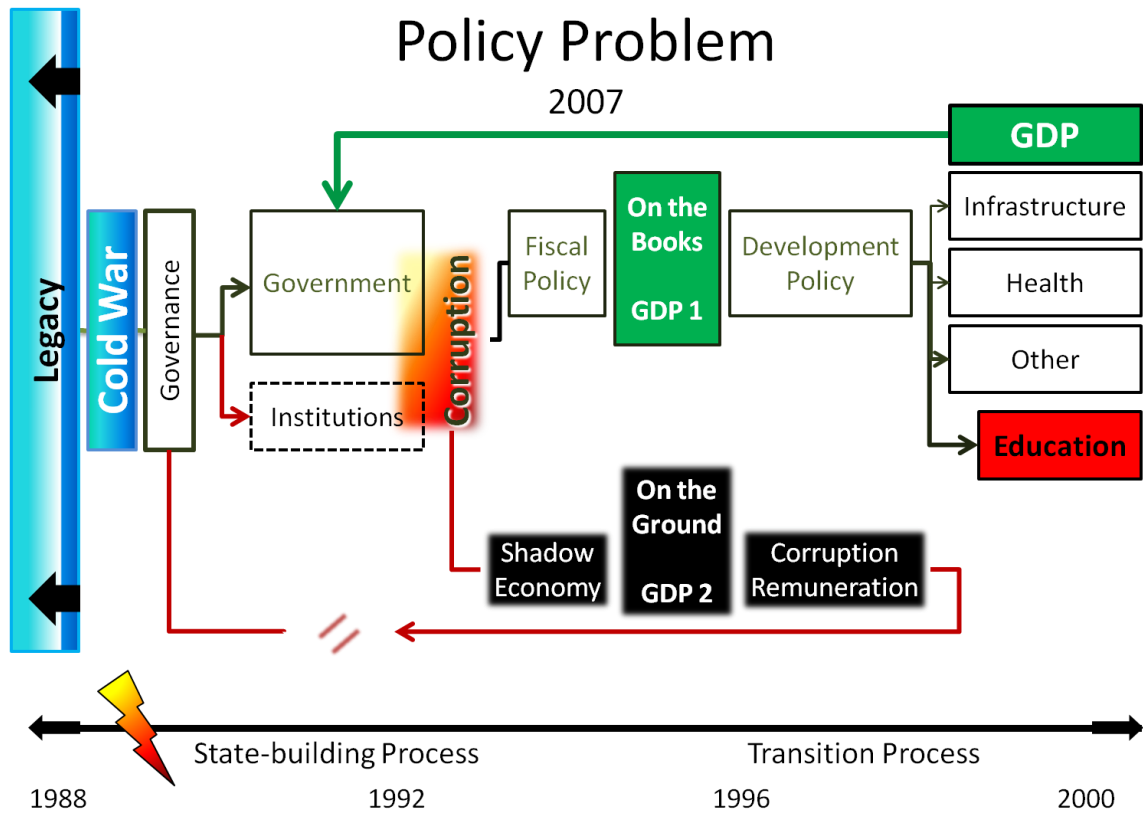
Policy Problem

2007

Figure 8 The Policy Problem.

REFERENCES

Anonymous. (1985). Charter of the United Nations and Statute of the International Court of Justice. New York. NY: United Nations.

_____. (1990). *Defining and Measuring Human Development*. New York, NY: United Nations Development Programme.

_____. (1998). Statistical information system on expenditure in education. Paris, France: United Nations Education, Science, and Cultural Organization.

_____. (2000a). Anticorruption in Transition: A Contribution to the Policy Debate. Washington, D.C.: The World Bank.

_____. (2000b). Confronting Corruption: The Elements of a National Integrity System. Berlin, Germany: Transparency International.

_____. (2005). *Global Monitoring Report*: Understanding Education Quality. Washington, D.C.: The World Bank

_____. (2006). *Anticorruption Report*. Washington, D.C.: United States Agency for International Development.

_____. (2007a). *Human Development Report*. New York, NY: United Nations Development Programme.

_____. (2007b). *Towards Better Measurement of Government*. OECD Working Paper Series on Public Governance, 2007(1). Paris, France: Organisation for Economic Co-operation and Development Publishing.

_____. (2008a). Business Environment and Enterprise Performance Survey. Washington, D.C.: World Bank Group.

_____. (2008b). *Global Education Digest*. Montreal, Quebec: United Nations Education, Science, and Cultural Organization Institute for Statistics.

_____. (2008c). *Human Development Report*. New York, NY: United Nations Development Programme.

_____. (2008d). *Millennium Development Goals Report*. New York, NY: United Nations Development Programme.

_____. (2009a). *CIA World Fact Book*. Washington, D.C.: Central Intelligence Agency of the United States of America.

_____. (2009b). Corruption in the Education Sector. *Transparency International Working Paper Series, 2009*(4).

_____. (2009c). *Global Corruption Report*. Berlin, Germany: Transparency International.

_____. (2009d). *Global Education Digest*: Comparing education statistics across the world. Montreal, Quebec: United Nations Education, Science, and Cultural Organization Institute for Statistics.

_____. (2009e). *Human Development Report*. New York, NY: United Nations Development Programme.

_____. (2009f). *What is Good Governance?*. Bangkok, China: United Nations Economic and Social Commission for Asia and The Pacific.

_____. (2009g). *World Development Indicators*. Retrieved 6/12/2011 from The World Bank: http://go.worldbank.org.

_____. (2010a). *Conflict Barometer 2010*. Heidelberg, Germany: Heidelberg Institute for International Conflict Research.

_____. (2010b). *The Corruptions Perceptions Index*. Berlin, Germany: Transparency International.

_____. (2010c). Countries and Regions. *U.S. State Department*. Retrieved 6/12/2011 from http://www.state.gov/r/pa/ei/bgn/index.htm.

_____. (2010d). *Education for All Global Monitoring Report*: Reaching the marginalized. Montreal, Quebec: United Nations Education, Science, and Cultural Organization.

_____. (2010e). Fostering Social Accountability: From Principle to Practice. Conference paper. Washington, D.C.: *United Nations Development Program*.

_____. (2010f). International Human Development Indicators. *Human Development Report*, 2010.

_____. (2010g). *Recovery and Reform*. London, UK: European Bank for Reconstruction and Development.

_____. (2010h). *Regional Trade Agreement Database*. Retrieved 8/26/2011 from World Trade Organization: www.wto.org

_____. (2010i). *Transition Report 2010: Recovery and Reform*. London, UK: European Bank for Reconstruction and Development.

_____. (2010j). *World Bank Education Projects Database*. Retrieved 8/26/2010 from http://go.worldbank.org.

_____. (2011a*)*. Country Studies. Washington, D.C.: *Library of Congress*.

_____. (2011b). EU Candidate and Pre-Accession Countries' Economies Quarterly. Brussels, Belgium: European Commission.

_____. (2011c). *Eurostat*. Retrieved 6/28/2011 from http://ec.europa.eu/statistics.

_____. (2011d). The IMF and Good Governance., *The Role of the IMF in Governance Issues*. Washington, D.C.: International Monetary Fund.

_____. (2011e). *International Comparisons Program*. Washington, D.C.: The World Bank.

_____. (2011f). *IMF's Lagarde Calls for Unity*. Wall Street Journal, p. 1. United Press International. September 23.

Abed, George T., & Gupta, Sanjeev (2002a). The Economics of Corruption: An Overview. Washington, D.C.: *International Monetary Fund.*

Abed, George T., & Gupta, Sanjeev (Eds.). (2002b). *Governance, Corruption, & Economic Performance.* Washington, D.C.: International Monetary Fund.

Alesina, Alberto F., Devleeschauwer, Arnaud, Easterly, William, Kurlat, Sergio, & Wacziarg, Romain T. (2002). Fractionalization. *Harvard Institute of Economic Research Discussion Paper, 1959*, 64.

Alkire, Sabina (2005). Why the Capability Approach?. *Journal of Human Development, 6*(1), 115-133.

Anand, Sudhir, & Sen, Amartya (2000). Human Development and Economic Sustainability. *World Development, 28*(12), 2029-2049.

Armitage, Richard L., & Nye, Joseph S. Jr. (2007). *A Smarter, More Secure America*. Washington, D.C.: Center for Strategic and International Studies.

Armstrong, Elia (2005). Integrity, Transparency and Accountability in Public Administration: Recent Trends, Regional and International Developments and Emerging Issues. Washington, D.C.: United Nations Public Administration Programme.

Arrow, Kenneth J. (1962). The Economic Implications of Learning by Doing. *Review of Economic Statistics, 29*(3), June, 155-173.

Arrow, Kenneth J. (1963a). *Social Choice and Individual Values* (2nd ed.). New York, NY: Wiley.

Arrow, Kenneth J. (1963b). Uncertainty and the Welfare Economics of Medical Care. *American Economic Review of Economic Statistics, 53*, 941-973.

Baddeley, Michelle (2006). Convergence or Divergence? The Impacts of Globalisation on Growth and Inequality in Less Developed Countries. *International Review of Applied Economics, 20*(3), 391.

Barro, Robert J. (1991). Economic Growth in a Cross-Section of Countries. *The Quarterly Journal of Economics, 106*(2), 407-443.

Barro, Robert J. (2000). Inequality and Growth in a Panel of Countries. *Journal of Economic Growth, 5*(1), 5-32.

Barro, Robert J. (2001a). *Determinants of Economic Growth: A Cross-country Empirical Study* (5th ed.). Cambridge, MA: Massachusetts Institute of Technology Press.

Barro, Robert J. (2001b). Human Capital and Growth. *The American Economic Review, 91*(2), 12.

Barro, Robert J., & Lee, JongWha (1993). International Comparisons of Educational-Attainment. *Journal of Monetary Economics, 32*(3), 363-394.

Barro, Robert J., & Lee, JongWha (1996). International measures of schooling years and schooling quality. *The American Economic Review, 86*(2), 218.

Barro, Robert J., & Lee, JongWha (2001). International data on educational attainment: Updates and implications. *Oxford Economic Papers, 53*(3), 541.

Barro, Robert J., Lee, JongWha, & Stokey, Nancy L. (1994). Sources of economic growth: Comments on Barro and Lee. *Carnegie - Rochester Conference Series on Public Policy, 40*(1).

Barro, Robert J., & McCleary, Rachel M. (2003). Religion and Economic Growth Across Counties. *American Sociological Review, 68*(5), 760.

Barro, Robert J., & Sala-i-Martin, Xavier (1991). Convergence across states and regions. *Brookings Papers on Economic Activity*(1), 107-182.

Barro, Robert J., & Sala-i-Martin, Xavier (2004). *Economic Growth* (2nd ed.). Boston, MA: Massachusetts Institute of Technology Press.

Baumgartner, Frank R., & Jones, Bryan D. (1993). *Agendas and Instability in American Politics.* Chicago, Il: University of Chicago Press.

Beissinger, Mark (2006). Soviet Empire as "Family Resemblance". *Slavic Review, 65*(2), 294.

Besancon, Marie (2003). Good Governance Rankings: The Art of Measurement. *World Peace Foundation, 36*(40).

Boswell, Nancy Zucker, & Rose-Ackerman, Susan (1996). Are International Institutions Doing Their Job?. *Corruption and Democracy, 90,* 83-90.

Boughton, James, & Bradford Jr., Colin (2007). Global Governance: New Players, New Rules: Why the 20th-century model needs a makeover. *Finance and Development, 44*(4).

Bovaird, Tony, & Loffler, Elke (2003). Evaluating the quality of public governance: Indicators, models and methodologies. *International Review of Administrative Sciences, 69*(3), 313-328.

Breusch, Trevor (2005*). Estimating the Underground Economy using MIMIC Models. Canberra, Australia: *Australian National University*.

Brewer, Dominic J., Krop, Cathy, Gill, Brian P., & Reichardt, Robert (1999). Estimating the Cost of National Class Size Reductions Under Different Policy Alternatives. *Educational Evaluation and Policy Analysis, 21*(2), 179-192.

Brewer, Garry D., & deLeon, Peter (1983). *The Foundations of Policy Analysis*. Homewood, Il: The Dorsey Press.

Brinkley, Douglas (2003). Wheels for the World: Henry Ford, His Company, and a Century of Progress,1903-2003. New York: Viking.

Buehn, Andreas, & Schneider, Freidrich G. (2009). Corruption and the Shadow Economy: A Structural Equation Model Approach. Bonn, Germany: *The Institute for the Study of Labor*. Discussion Paper No. 4182.

Burleigh, Michael (Ed.). (1996). *Confronting the Nazi Past: New Debates on Modern German History*. London, UK: Collins and Brown, Limited.

Burns, Arthur F., & Mitchell, Wesley C. (1946). *Measuring Business Cycles*. New York, NY: National Bureau of Economic Research.

Carilli, Anthony M., Coyne, Christopher J., & Leeson, Peter T. (2008). Government Intervention and the Structure of Social Capital. *Austrian Economics Journal*, 21, 209-218.

Chua, Yvonne T. (2006). An Investigation of Corruption in Philippine Education. Manila, Philippines: *Philippine Center for Investigative Journalism*.

Cobb, C. W., & Douglas, P. H. (1928). A Theory of Production. *The American Economic Review, Supplement*(18), 139-165.

Cortright, Joseph (2001). New Growth Theory, Technology and Learning: A Practitioners Guide. *Reviews of Economic Development Literature and Practice, No. 4*. United States Economic Development Administration.

Deininger, Klaus W., & Squire, Lyn (1996). A new data set measuring income inequality. *The World Bank Economic Review, 10*(3), 565-591.

deLeon, Peter (1993). *Thinking About Political Corruption*. Armonk, New York: M.E. Sharpe.

deLeon, Peter (1998). Introduction: The Evidentiary Base For Policy Analysis: Empiricist Versus Postpositivist Positions. *Policy Studies Journal, 26*(1), 109-113.

deLeon, Peter, & Green, Mark T. (2004). Political Corruption: Establishing the Parameters. *International Public Management Review, 5*(1), 70-98.

Dell'Anno, Roberto, & Schneider, Freidrich Georg (2006). Estimating the Underground Economy by Using MIMIC Models: A Response to T. Breusch´s Critique., Johannes Kepler University Linz, Austria.: *Economics Working Paper Series (2006)*07.

Diamond, Jarod Mason (1997). *Guns, Germs, and Steel: The Fates of Human Societies*. New York, NY: W.W. Norton & Co.

Dreher, Axel, Kotsogiannis, Christos, & McCorriston, Steve (2005). How do Institutions Affect Corruption and the Shadow Economy?. *Public Economics Working Paper No. 502012*. Thurgau Institute of Economics, Kreuzlingen, Switzerland.

251

Easterly, William, & Levine, Ross (2001). What have we learned from a decade of empirical research on growth? It's Not Factor Accumulation: Stylized Facts and Growth Models. *World Bank Economic Review, 15*(2), 177-219.

Eilat, Yair, & Zinnes, Clifford (2000). The Evolution of the Shadow Economy in Transition Countries: Consequences for Economic Growth and Donor Assistance. Consulting Assistance on Economic Reform II Discussion Paper No. 65: *Harvard Institute for International Development*.

Elisseeff, Vadime (Ed.). (1998). *The Silk Roads: Highways of Culture and Commerce*. Paris, France: United Nations Education, Science, and Cultural Organization Publishing.

Feige, Edgar L., & Urban, Ivica (2008). Measuring underground (unobserved, non-observed, unrecorded) economies in transition countries: Can we trust GDP?. *Journal of Comparative Economics, 36*(2), 287-306.

Freire, Paulo (1970). *Pedagogy of the Oppressed* (30th Anniversary Edition). London, UK: Continuum International Publishing Group Inc.

Friedman, Milton (1997). Public schools: Make them private. *Education Economics*, *5*(3), 341.

Friedman, Thomas L. (2005). The World is Flat: A Brief History of the Twenty First Century. Public Affairs Program (Lecture) . New York, NY: Carnegie *Council for Ethics in International Affairs*.

Gadotti, Moacir, & Torres, Carlos Alberto (2005). *Paulo Freire: A Homage*. (Lecture). Chicago, IL: National-Louis University.

Galbraith, James K., & Kum, Hyunsub (2005). Estimating the Inequality of Household Incomes: A Statistical Approach to the Creation of a Dense and Consistent Data Set. *The Review of Income and Wealth, 51*(1), 115-143.

Gini, Corrado (1921). Measurement of Inequality and Incomes. *The Economic Journal,* 31, 124-126.

Glasner, David, & Cooley, Thomas F. (Eds.). (1997). *Business Cycles and Depressions: An Encyclopedia.* Taylor & Francis.

Goodwin, Richard M. (1951). The Non-Linear Accelerator and the Persistence of Business Cycles*. Econometrica*, 19, 1-17.

Grindle, Merilee S. (2011). Governance Reform: The New Analytics of Next Steps. *Governance: An International Journal of Policy, Administration, and Institutions, 24*(3), 415-418.

Gruber, Jonathan (2010). *Public Finance and Public Policy*. New York, NY: Worth Publishers.

Gujarati, Damodar N., & Porter, Dawn C. (2009). *Basic Econometrics* (5th ed.). New York, NY: McGraw-Hill.

Gupta, Dipak K. (2001). Analyzing Public Policy: Concepts, Tools, and Techniques. Washington, D.C.: CQ Press.

Gupta, Sanjeev, Davoodi, Hamid, & Alonso-Term, Rosa (1998). Does Corruption Affect Income Inequality and Poverty?. *International Monetary Fund Working Paper, 98*(76), 1-41.

Gupta, Sanjeev, Davoodi, Hamid, & Tiongson, Erwin R (2000). Corruption and the Provision of Health Care and Education Services. *International Monetary Fund Working Paper, 00*(116), 1-33.

Hahn, Frank, & Solow, Robert (1997). *A Critical Essay on Modern Macroeconomic Theory.* Cambridge, MA: Massachusetts Institute of Technology Press.

Hallak, Jacques, & Poisson, Muriel (2007). Corrupt schools, corrupt universities: What can be done?. *International Institute for Educational Planning.* Paris, France: United Nations Education, Science, and Cultural Organization.

Hayek, Friedrich A. von (1933). *Monetary Theory and the Trade Cycle* (1975 ed.). New York, NY: Augustus M. Kelley, 1975.

Heidenheimer, Arnold J., & Johnston, Michael (2002). *Political Corruption: Concepts & Contexts* (3rd ed.). Piscataway, NJ: Transaction Publishers.

Hicks, John R. (1950). *A Contribution to the Theory of the Trade Cycle* (2nd ed.). Oxford, UK: Clarendon Press.

Hirsch, Donald E., Kett, Joseph F., & Trefil, James S. (Eds.). (2002). *The New Dictionary of Cultural Literacy.* New York, NY: Houghton Mifflin Harcourt.

Howitt, Peter W. (1986). The Keynesian Recovery. *The Canadian Journal of Economics, 19*(4), 626.

Howitt, Peter W. (1997). A critical essay on modern macroeconomic theory. *Journal of Economic Literature, 35*(1), 132.

Howitt, Peter W. (1999). Steady endogenous growth with population and R & D inputs growing. *The Journal of Political Economy, 107*(4), 715-730, August.

Howitt, Peter W., Aghion, Philippe, & Zilibotti, Fabrizio (1999). Endogenous growth theory. *The Canadian Journal of Economics, 32*(5), 1338-1341.

Howitt, Peter W., & Mayer-Foulkes, David (2005). R&D, Implementation, and Stagnation: A Schumpeterian Theory of Convergence Clubs. *Journal of Money, Credit, and Banking, 37*, 147-177.

Johnston, Michael (1986). Right & Wrong in American Politics: Popular Conceptions of Corruption. *Polity, 18*(3), 367-391.

Johnston, Michael (2007). Benchmarks for Integrity: Tracking Trends in Governance. *Organisation for Economic Co-ordination and Development Papers, 7*(7), 1.

Juglar, Clement (1893). *A Brief History of Panics and Their Periodical Occurrence in the United States* (D. W. Thom, Trans. 1st ed.). New York, NY: G. P. Putnam's Sons.

Kaldor, Nicholas (1959). Economic Growth and the Problem of Inflation. *Economica, 26*, 287-298.

Kalecki, Michal (1954). Theory of Economic Dynamics: An essay on cyclical and long-run changes in capitalist economy. Monthly Review Press. New York, NY.

Kaminski, Matthew (2005). *Membership Has Its Privileges -- Or Does It?*. Wall Street Journal, p. A15. New York, NY.

Kargbo, Abubakar H. (2006). *Corruption: Definition and Concept Manifestations and Typology in the Africa Context*. Paper presented at The Training for Members of Parliament and Members of Civil Society from English speaking West Africa: Gambia, Ghana, Nigeria, Liberia, and Sierra Leone.

Kaufmann, Daniel (2003). *Rethinking Governance: Empirical Lessons Challenge Orthodoxy*. Washington, D.C.: World Bank Institute.

Kaufmann, Daniel (2006). *Myths and Realities of Governance and Corruption.* In World Economic Forum, Global Competitiveness Report 2005-2006 (pp. 81-98). Washington, D.C.: Palgrave Macmillan.

Kaufmann, Daniel, Kraay, Aart, & Mastruzzi, Massimo (2008). Governance Matters VII: Aggregate and Individual Governance Indicators, 1996-2007. *The World Bank Group Policy Research Working Paper No. 4654*.: Washington, D.C.

Kaufmann, Daniel, Kraay, Aart, & Zoido-Lobatón, Pablo (2000). Governance Matters. *World Bank Working Paper Series, No. 2196*, 1-61.

Kersley, Richard, Rochon, Stephane, & O'Sullivan, Michael (2008). *Intangible Infrastructure: The key to growth:* Credit Suisse Research Institute. Zurich, Switzerland.

Kettl, Donald F. (2000). The Transformation of Governance: Globalization, Devolution, and the Role of Government. *Public Administration Review, 60*(6), 488-497.

Keynes, John Maynard (1936). *The General Theory of Interest, Employment, and Money*. London, UK: Macmillan.

King, Robert G., & Levine, Ross (1993). Finance and Growth - Schumpeter Might Be Right. *The Quarterly Journal of Economics, 108*(3), 717-737.

Kitchin, Joseph (1923). Cycles and Trends in Economic Factors. *The Review of Economics and Statistics, 5*(1), 10-16.

Klenow, Peter J., & Rodríguez-Clare, Andrés (1997). Economic growth: A review essay. *Journal of Monetary Economics, 40*(3), 597-617.

Klenow, Peter J., & Rodríguez-Clare, Andrés (2005). *Externalities and Growth*. In P. Aghion & S. N. Durnlauf (Eds.), Handbook of Economic Growth (Vol. 1, Part A, pp. 817-861). Amsterdam, The Netherlands: Elsevier B.V.

Klingner, Donald E., & Sabet, Gamal M. (2005). Knowledge Management, Organizational Learning, Innovation, and Technology Transfer: What They Mean and Why They Matter. *Comparative Technology Transfer and Society, 3*(3), 199-210.

Klitgaard, Robert E. (1988). *Controlling Corruption.* Berkeley, CA: University of California Press.

Kondratiev, Nikolai D. (1926). *The Long Waves in Economic Life*, Sozialwissenschaft und Sozialpolitik. 56(3). 573-609.

Kooiman, Jan, & Jentoft, Svein (2009). Meta-Governance: Values, Norms, and Principles, and the Making of Hard Choices. *Public Administration 87*(4), 818-836.

Kornai, Janos (1992). *The Socialist System: The Political Economy of Communism.* Princeton, NJ: Princeton University Press.

Kornai, Janos (2005). *The Great Transformation of Central and Eastern Europe: Success and Disappointment.* Conference Paper. International Economics Associaton 14th World Congress: Marrakech, Morocco.

Krueger, Anne O. (1974). The Political Economy of the Rent-Seeking Society. *American Economic Review, 64*(3), 291-303.

Krugman, Paul R. (1998). What's New About the New Economic Geography?. *Oxford Review of Economic Policy, 14*(2), 7.

Krugman, Paul R. (2000). Technology, Trade and Factor Prices. *Journal of International Economics, 50*(1), 51.

Kurtzman, Joel, Yago, Glenn, & Phumiwasana, Tripho (2004). The Global Costs of Opacity. *Massachusetts Institute of Technology, Sloan Management Review, 46*(1), 38.

Kuznets, Simon S. (1934). *National Income 1929-1932*. Library of Congress.

Kuznets, Simon S. (1940). Schumpeter's Business Cycles. *The American Economic Review, 30*(2), 257-271.

Kuznets, Simon S. (1966). *Modern Economic Growth: Rate, Structure and Spread*. New Haven, CT: Yale University Press.

Kuznets, Simon S. (1971). Economic Growth of Nations: Total Output and Production Structure. Boston, MA: Harvard University Press.

Kuznets, Simon S. (1973). Modern Economic Growth: Findings and Reflections. *The American Economic Review, 63*(3), 247-258.

La Porta, Rafael, Lopez-De-Silanes, Florencio, Shleifer, Andrei, & Vishny, Robert W. (1999). The Quality of Government. *Journal of Law, Economics, and Organization, 15*(1), 222-279.

La Porta, Rafael, & Shleifer, Andrei (2008). The Unofficial Economy and Economic Development. *Working Paper No. 2009-57.* Tuck School of Business,

Levitt, Theodore (1983). The Globalization of Markets. *Harvard Business Review, 61*(3), 92-102.

Levy, Daniel (2007). Price Adjustments Under the Table: Evidence on Efficiency-enhancing Corruption. *European Journal of Political Economy, 17*, 749-777.

Lozada, Carlos (2002). Economic Growth is Reducing Global Poverty. *National Bureau of Economic Research Digest, October.*

Lucas, Robert E. Jr. (2009). Ideas and Growth. *Economica, 76*(301), 1-19.

Lynn, Laurence E. Jr. (1998). The new public management: How to transform a theme into a legacy. *Public Administration Review, 58*(3), 231.

Maddison, Angus (2009). *Historical Statistics of the World Economy: 1-2006 AD.* University of Groningen, Groningen, the Netherlands.

Maher, Joanne (Ed.). (2004). *The Europa World Year Book (45 ed. Vol. 1& 2).* London, UK: Europa Publications, Taylor and Francis Group.

Maher, Joanne (Ed.). (2008). *The Europa World Year Book* (*49 ed. Vol. 1).* London, UK: Europa Publications, Taylor and Francis Group.

Martin, Ron, & Sunley, Peter (1998). Slow Convergence? The new endogenous growth theory and regional development. *Economic Geography, 74*(3), 201-227.

Matheson, Troy D. (2008). Decomposing Productivity Growth and Divergence: An Index Number Approach. *Empirical Economics, 34*(2), 273-284.

Mauro, Paolo (1995). Corruption and Growth. *The Quarterly Journal of Economics, 110*(3), 681-712.

Mauro, Paolo (1997). The Effects of Corruption on Growth, Investment, and Government Expenditure: A Cross-Country Analysis. *Working Paper No. 96*/98. Washington, D.C.: International Monetary Fund.

Mauro, Paolo (1998a). Corruption and the Composition of Government Expenditure. *Journal of Public Economics, 69*, 263-279.

Mauro, Paolo (1998b). Corruption: Causes, Consequences, and Agenda for Further Research. *Finance and Development, 35*(1), 11-14.

Mauro, Paolo (2000). *Why Worry About Corruption?.* Washington, D.C.: International Monetary Fund.

Mauro, Paolo (2004). The Persistence of Corruption and Slow Economic Growth. *International Monetary Fund Staff Papers, 51*(1), 1-18. Washington, D.C.: International Monetary Fund.

Mauro, Paolo, Abed, George T., & Gupta, Sanjeev (1998). Governance, Corruption, and Economic Performance (pp. 225-244). Washington, D.C.: *International Monetary Fund*.

Mauro, Paolo, Abed, George T., & Gupta, Sanjeev (2002). Corruption and the Composition of Government Expenditure. Washington, D.C.: *International Monetary Fund*.

Mazumdar, Krishna (2003). Do standards of living converge? A cross-country study. *Social Indicators Research, 64*(1), 29-50.

Merton, Robert K. (1968). *Social Theory and Social Structure* (1968 Enlarged ed.). New York, NY: Simon and Schuster.

Metzler, Lloyd A. (1941). The Nature and Stability of Inventory Cycles. *Review of Economic Studies, Vol. 23*, 113-129.

Mitchell, Wesley C. (1928). *Business Cycles; The Problem and Its Setting*. New York, NY: National Bureau of Economic Research, Inc.

Monas, Sidney (1984). Censorship, Film, and Soviet Society: Some reflections of a Russia-watcher. *Studies in Comparative Communism, 17*(3/4), 163-172.

Moody-Stuart, George (1996). The Costs of Grand Corruption. *Economic Reform Today, 4*, 19-24.

Movsovic, M. I. (1959). *Technical and Vocational Education in the Union of Soviet Socialist Republics*. Paris, France: United Nations Education, Science, and Cultural Organization.

Nelson, Richard R., & Phelps, Edmund S. (1966). Investment in Humans, Technological Diffusion, and Economic Growth. *American Economic Review, 56*(2), 69-75.

Nissan, Edward (1991). The Dynamics of Agricultural Contribution to Economic Growth. *Review of Black Political Economy, 20*(1), 5.

North, Douglass C. (1990*). Institutions, Institutional Change and Economic Performance*. New York, NY: Cambridge University Press.

North, Douglass C. (1991a*).* Institutions. *The Journal of Economic Perspectives, 5*(1), 97.

North, Douglass C. (1991b). Towards a Theory of Institutional Change. *The Quarterly Review of Economics and Business, 31*(4), 3.

North, Douglass C. (1992). Institutions and Economic Theory. *The American Economist, 36*(1), 3-6.

North, Douglass C. (1994). Economic Performance Through Time. *The American Economic Review, 84*(3), 359.

Nye, Joseph S. (1967). Corruption and Political Development: A Cost-Benefit Analysis. *American Political Science Review, 61*(2), 417-427.

Nye, Joseph S. (2006). *The Fragility of a Flat World. Project Syndicate*, (June). Retrieved on 6/13/2011 from http://www.project-syndicate.org/nye34.

Nye, Joseph S. (2008). Smart Power. *Harvard Business Review*, (November). pp. 55-59.

Ofer, Gur (1987). Soviet Economic Growth: 1928-1985. *Journal of Economic Literature, 25*(4), 1767.

Olson, Mancur Jr., Sarna, Naveen, & Swamy, Anand V. (2000). Governance and Growth: A simple hypothesis explaining cross-country differences in productivity growth. *Public Choice, 102*(3-4), 341-364.

Patrinos, Harry Anthony (2007). *Demand-side Financing in Education*. Paris, France: The International Institute for Educational Planning, The International Academy of Education.

Pesic, Vesna (2007). State Capture and Widespread Corruption in Serbia. Brussels, Belgium: *Center for European Policy Studies*.

Phelps, Edmund S. (2008). Macroeconomics for a Modern Economy. *American Economist, 52*(1), 20.

Phelps, Edmund S., & Nelson, Richard R. (1966). Investment in Humans, Technological Diffusion, and Economic Growth. *American Economic Review, 56*(2), 69-75.

Pritchett, Lant H. (1997). Divergence, Big Time. *Journal of Economic Perspectives, 11*(3), 14.

Pritchett, Lant H. (2001). Where has all the education gone?. *The World Bank Economic Review, 15*(3), 367-391.

Putnam, Robert D. (2000). Bowling Alone: The Collapse and Revival of American Community. New York, NY: Simon and Schuster.

Radelet, Steve (2003). Challenging Foreign Aid: A Policymaker's Guide to the Millennium Challenge Account. Washington, D.C.: Center for Global Development.

Relly, Jeannine (2011). *Testing Vertical Accountability: A Cross-National Study of the Influence of Information Access on the Control of Corruption*. Conference paper. the 1st Global Conference on Transparency Research. Rutgers University, Newark, NJ.

Robinson, James Harvey (1902). *An Introduction to the History of Western Europe*. Boston, MA: Ginn & Company.

Romer, Paul M. (1986). Increasing Returns and Long-Run Growth. *The Journal of Political Economy, 94*(5), 1002-1037.

Romer, Paul M. (1990). Endogenous Technological Change. *The Journal of Political Economy, 98*(5), Part 2: The Problem of Development: A Conference of the Institute for the Study of Free Enterprise Systems, S71-S102.

Romer, Paul M. (1993). Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards. *Brookings Papers on Economic Activity, Microeconomics* 2, 345-399.

Romer, Paul M. (1994a). Beyond Classical and Keynesian Macroeconomic Policy. *Policy Options, 15*(6), 15-21.

Romer, Paul M. (1994b). The Origins of Endogenous Growth. *The Journal of Economic Perspectives, 8*(1), 3-22.

Romer, Paul M. (1996). Why, indeed, in America? Theory, history, and the origins of modern economic growth. *The American Economic Review, 86*(2), 202.

Romer, Paul M. (1998a). Economic Growth: It's All in Your Head. *Outlook, No. 1.*

Romer, Paul M. (1998b). Innovation: The New Pump of Growth. *Blueprint Magazine: Ideas for a New Century, Winter*(1), 27 - 31.

Romer, Paul M. (2001). What have we learned from a decade of empirical research on growth? Comment on 'It's not factor accumulation: Stylized facts and growth models,' by William Easterly and Ross Levine. *The World Bank Economic Review, 15*(2), 225-227.

Romer, Paul M. (Ed.). (2007) *The Concise Encyclopedia of Economics.* Indianapolis, IN: Liberty Fund.

Romer, Paul M., & Barro, Robert J. (1990). Human Capital and Growth: Theory and Evidence; A Comment. *Carnegie - Rochester Conference Series on Public Policy, 32*, 251-286. Elsevier.

Rose-Ackerman, Susan (1978). *Corruption: A Study in Political Economy*. New York, NY: Academic Press.

Rose-Ackerman, Susan (1999). *Corruption and Government: Causes, Consequences, and Reform.* New York, NY: Cambridge University Press.

Rose-Ackerman, Susan (2008). Corruption and Government. *International Peace Keeping, 15*(3), 328-343.

Rose-Ackerman, Susan (Ed.). (2006*). International Handbook on the Economics of Corruption.* Cheltenham, Gloucestershire: Edward Elgar Publishing.

Rostow, Walt Whitman (1971). *The Stages of Economic Growth: A Non-Communist Manifesto* (2nd ed.). New York, NY: Cambridge University Press.

Rostow, Walt Whitman (1975). Kondratieff, Schumpeter, and Kuznets: Trend Periods Revisited. *The Journal of Economic History, 35*(4), 719-753.

Rostow, Walt Whitman (1991). *The Stages of Economic Growth: A Non-Communist Manifesto* (3rd ed.). New York, NY: Cambridge University Press. (Original work published 1960)

Rotberg, Robert I. (2005). Strengthening Governance: Ranking Countries Would Help. *Washington Quarterly, 28*(1), 71-81.

Rotberg, Robert I. (2009). Governance and Leadership in Africa: Measures, Methods, and Results. *Journal of International Affairs, 62*(2), 113.

Rothschild, Emma (1986). A Divergence Hypothesis. *Journal of Development Economics, 23*(2), 205-226.

Russell, Barrie (2010). *Revenue Administration: Managing the Shadow Economy*. Washington, D.C.: International Monetary Fund.

Sabet, Mohamed Gamal, & Klingner, Donald (1993). Exploring The Impact of Professionalism on Administrative Innovation. *Journal of Public Administration Research and Theory, 3*(2), 252-266.

Sachs, Jeffrey D. (2005). *The End of Poverty: Economic Possibilities of Our Time*. New York, NY: Penguin Group.

Sachs, Jeffrey D., & Warner, Andrew M. (1995). Economic Convergence and Economic Policies. *National Bureau of Economic Research Working Paper, No. 5039*.

Sadik, Jacques (2008). Technology Adoption, Convergence, and Divergence. *European Economic Review, 52*(2), 338.

Sala-i-Martin, Xavier (1997). I Just Ran Two Million Regressions. *The American Economic Review Papers and Proceedings, 87*(2), 7.

Sala-i-Martin, Xavier (2002). The World Distribution of Income: Estimated from Individual Country Distributions. *National Bureau of Economic Research, Working Paper No. 8933*.

Salamon, Lester M., & Odus, Elliot, V. (2002). *The Tools of Government: A Guide to The New Governance*. London, UK: Oxford University Press.

Sandholtz, Wayne, & Koetzle, William (2000). Accounting for Corruption: Economic Structure, Democracy, and Trade. *International Studies Quarterly, 2000*(44), 31-50.

Schneider, Friedrich George (2009). The Institutional Economics of Corruption and Reform: Theory, Evidence and Policy. *Public Choice, 138*(1-2), 257-258.

Schneider, Friedrich Georg, Buehn, Andreas, & Montenegro, Claudio E. (2010). Shadow Economies All Over the World: New Estimates for 162 Countries from 1999 to 2007. *World Bank Working Paper Series, 535*6, 53.

Schneider, Friedrich George & Enste, Dominik H. (2002). *Hiding in the Shadows: The Growth of the Underground Economy*. Economic Issues Number 30. Washington, D.C.: International Monetary Fund.

Schneider, Friedrich Georg & Enste, Dominik H. (2000). Shadow Economies Around the World: Size, Causes, and Consequences. *International Monetary Fund Working Paper* 00/26, 56.

Schneider, Mark, Teske, Paul, Marschall, Melissa, Mintrom, Michael, & Roch, Christine (1997). Institutional arrangements and the creation of social capital: The effects of public school choice. *The American Political Science Review, 91*(1), 82.

Schumpeter, Joseph A. (1939). Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process (Vol. I & II). New York, NY: McGraw-Hill.

Schumpeter, Joseph A. (1942). *Capitalism, Socialism and Democracy* (3rd 1950 ed.). New York, NY: Harper & Borthers.

Sen, Amartya (1984). The Living Standard. *Oxford Economics Papers, 36*(supp), 74-90.

Sen, Amartya (1988). Mortality as an indicator of economic success and failure. *The Economic Journal, 108*(446), 1-25.

Sen, Amartya (1997). Human Capital and Human Capability. *World Development, 25*(12), 1959-1961.

Sen, Amartya (1999). *Development as Freedom*. Oxford, UK: Oxford University Press.

Sen, Amartya (2000). Cost-Benefit Analysis: Legal, Economic, and Philosophical Perspectives. *The Journal of Legal Studies, 29*(2), 931-952.

Sen, Amartya (2004). Freedom as Progress. *Finance & Development, 41*(3), 4-7.

Serra, Danila (2006). Empirical Determinants of Corruption: A sensitivity analysis. *Public Choice, 126*(1-2), 225-256.

Shleifer, Andrei, & Vishny, Robert W. (1993). Corruption. *The Quarterly Journal of Economics, 108*(3), 599-617.

Simon, Herbert (1972). *Theories of Bounded Rationality*. In C. B. McGuire & R. Radner (Eds.). Decision and Organization (pp. 161-176): Amsterdam, the Netherlands: North-Holland Publishing.

Simon, Herbert A. (1986). Rationality in Psychology and Economics. *The Journal of Business, 59*(4), Part 2, S209-224.

Simon, Herbert A. (1997). *Models of Bounded Rationality: Empirically Grounded Economic Reason (Vol. 3)*. Cambridge, MA: Massechuttets Institute of Technology Press.

Slutsky, Eugen (1929). Random Events and Cyclical Oscillations. *Journal of the American Statistical Association*, 258-276.

Solow, Robert M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics, 70*(1), 65-94.

Solow, Robert M. (1957). Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics, 39*(3), 312-320.

Solsten, Eric (Ed.). (1991). Cyprus: A Country Study. Washington, D.C.: *Government Post Office for the Library of Congress*.

Stefes, Christoph H. (2006). Understanding Post-Soviet Transitions: Corruption, Collusion and Clientelism. New York, NY: Palgrave MacMillan.

Stern, David I. (2003). The Environmental Kuznets Curve. *International Society for Ecological Economics,* June.

Stoker, Gerry (1998). Governance as Theory: Five propositions. *International Social Science Journal, 50*(155), 17-28.

Suetonius (110). *The Lives of the Caesars, The Deified Julius* (J. C. Rolfe, Trans. Vol. 1). Cambridge, MA: Harvard University Press.

Tanzi, Vito (1998). Corruption Around the World: Causes, Consequences, Scope, and Cures. *International Monetary Fund Staff Paper 9863, 45*(4), 559-594.

Taylor, Fredrick Winslow (1911). *The Principles of Scientific Management*. New York, NY: Harper & Row, Publishers Incorporated.

Teske, Paul, & Schneider, Mark (2001). What research can tell policymakers about school choice. *Journal of Policy Analysis and Management, 20*(4), 609.

Thomann, Andreas (2008). Global Trends: Building Blocks of Healthy Economic Growth. Interview with Richard Kersley, Stephane Rochon, and Michael O'Sullivan. Intangible Infrastructure, the Key to Growth. Credit Suisse Online Publications, 5/12. Retrieved 6/12/2012 from https://infocus.credit-suisse.com/.../RI_Intangible_Infrastructure_081.

Thompson, Dennis F. (2007). Two Concepts of Corruption. [Conference paper]. Corruption and Democracy*, University of British Columbia*.

Treib, Oliver, Bahr, Holger, & Falkner, Gerda (2007). Modes of Governance: Towards a Conceptual Clarification. *Journal of European Public Policy, 14*(1), 1-20.

Treisman, D. (2000). The Causes of Corruption: A Cross-national Study. *Journal of Public Economics, 76*(3), 399-458.

Weber, Max (1930). *The Protestant Ethic and the Spirit of Capitalism.* (T. Parsons, Trans. 1950 ed.). London, UK: George Allen & Unwin Ltd.

Weimer, David L., & Vining, Aidan R. (2004). *Policy Analysis: Concepts and Practice* (4th ed.).Upper Saddle River, NJ: Prentice Hall.

Werlin, Herbert H. (1994). Revisiting Corruption - With a New Definition. *International Review of Administrative Sciences, 60*(4), 547-558.

Werlin, Herbert H. (2000). The Concept of Secondary Corruption. *International Review of Administrative Sciences, 66*(1), 181-185.

Wong, W. K. (2007). Economic Growth: A channel decomposition exercise. *B. E. Journal of Macroeconomics, 7*(1), 38. http://www.bepress.com/bejm. Retrieved 6/11/2011.

Wright, Phillip G. (1920). (Lecture), in Kitchin, J. (1923) 'Cycles and Trends in Economic Factors'. *The Review of Economics and Statistics 5*(1): 10-16. Cambridge, MA: Harvard University.

Xu, Z., & Li, H. (2008). Political Freedom, Economic Freedom, and Income Convergence: Do stages of economic development matter?. *Public Choice, 135*(3-4).

Yereli, Ahmet Burcin, Secilmis, İbrahim Erdem, & Basaran, and Alparslan (2007). Shadow Economy and Public Debt Sustainability in Turkey. *SAOPSTENJA/Communications.* Anakara, Turkey: Hecettepe Univeristy, 85-104.

Zhou, Fujin (2007). The Shadow Economy in Mongolia: Size, Causes and Consequences. Amsterdam, the Netherlands: *Tinbergen Institute Working Paper No.* 42.Edu